

H6. Global Warming: How To Approach The Science

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Testimony: House Subcommittee on Science and Technology

A Rational Discussion of Climate Change: the Science, the Evidence, the Response

I wish to thank the House Committee on Science and Technology for the opportunity to present my views on the issue of climate change—or as it was once referred to: global warming. The written testimony is, of course, far more detailed than my oral summary will be.

In the summary, I will simply try to clarify what the debate over climate change is really about.

- It most certainly is not about whether climate is changing: it always is.
- It is not about whether CO₂ is increasing: it clearly is.
- It is not about whether the increase in CO₂, by itself, will lead to some warming: it should.

The debate is simply over the matter of how much warming the increase in CO₂ can lead to, and the connection of such warming to the innumerable claimed catastrophes.

The evidence is that the increase in CO₂ will lead to very little warming, and that the connection of this minimal warming (or even significant warming) to the purported catastrophes is also minimal.

The arguments on which the catastrophic claims are made are extremely weak—and commonly acknowledged as such.

In my long experience with the issue of global warming, I've come to realize that the vast majority of laymen—including policymakers—do not actually know what the scientific debate is about. In this testimony, I will try to clarify this.

Some of you may, for example, be surprised to hear that the debate is not about whether it is warming or not or even about whether man is contributing some portion of whatever is happening. I'll explain this in this testimony. Unfortunately, some part of the confusion is explicitly due to members of the scientific community whose role as partisans has dominated any other role they may be playing.

Here are two statements that are completely agreed on by the IPCC. It is crucial to be aware of their implications.

1. A doubling of CO₂, by itself, contributes only about 1C to greenhouse warming. All models project more warming, because, within models, there are positive feedbacks from water vapor and clouds, and these feedbacks are considered by the IPCC to be uncertain.

2. If one assumes all warming over the past century is due to anthropogenic greenhouse forcing, then the derived sensitivity of the climate to a doubling of CO₂ is less than 1 C. The higher sensitivity of existing models is made consistent with observed warming by invoking unknown additional negative forcings from aerosols and solar variability as arbitrary adjustments.

Given the above, the notion that **alarming** warming is ‘settled science’ should be offensive to any sentient individual, though to be sure, the above is hardly emphasized by the IPCC.

The usual rationale for alarm comes from models. The notion that models are our only tool, even, if it were true, depends on models being objective and not arbitrarily adjusted (unfortunately unwarranted assumptions).

However, models are hardly our only tool, though they are sometimes useful. Models can show why they get the results they get. The reasons involve physical processes that can be independently assessed by both observations and basic theory. This has, in fact, been done, and the results suggest that all models are exaggerating warming.

The details of some such studies will be shown later in this testimony.

Quite apart from the science itself, there are numerous reasons why an intelligent observer should be suspicious of the presentation of alarm.

1. The claim of ‘incontrovertibility.’
2. Arguing from ‘authority’ in lieu of scientific reasoning and data or even elementary logic.
3. Use of term ‘global warming’ without either definition or quantification.
4. Identification of complex phenomena with multiple causes with global warming and even as ‘proof’ of global warming.
5. Conflation of existence of climate change with anthropogenic climate change.

Some Salient Points:

1. Virtually by definition, nothing in science is ‘incontrovertible’ –especially in a primitive and complex field as climate. ‘Incontrovertibility’ belongs to religion where it is referred to as dogma.

2. As noted, the value of ‘authority’ in a primitive and politicized field like climate is of dubious value –it is essential to deal with the science itself. This may present less challenge to the layman than is commonly supposed. Consider the following example:

This letter appeared the May 7, 2010, issue of *Science*. It was signed by 250 members of the National Academy of Science. Most signers had no background whatever in climate sciences.

Many were the 'usual suspects.' (ie, Paul Ehrlich, the late Steve Schneider, George Woodwell, Don Kennedy, John Schellnhuber, ...) but a few were indeed active contributors.

Here are two of their assertions:

(iii) Natural causes always play a role in changing Earth's climate, but are now being overwhelmed by human-induced changes.

(iv) Warming the planet will cause many other climatic patterns to change at speeds unprecedented in modern times, including increasing rates of sea-level rise and alterations in the hydrologic cycle.

Now, one of the signers was Carl Wunsch. Here is what he says in a recent paper in *Journal of Climate* (Wunsch et al, 2007) (and repeated a couple of weeks ago in a departmental lecture):

It remains possible that the data base is insufficient to compute mean sea level trends with the accuracy necessary to discuss the impact of global warming—as disappointing as this conclusion may be.

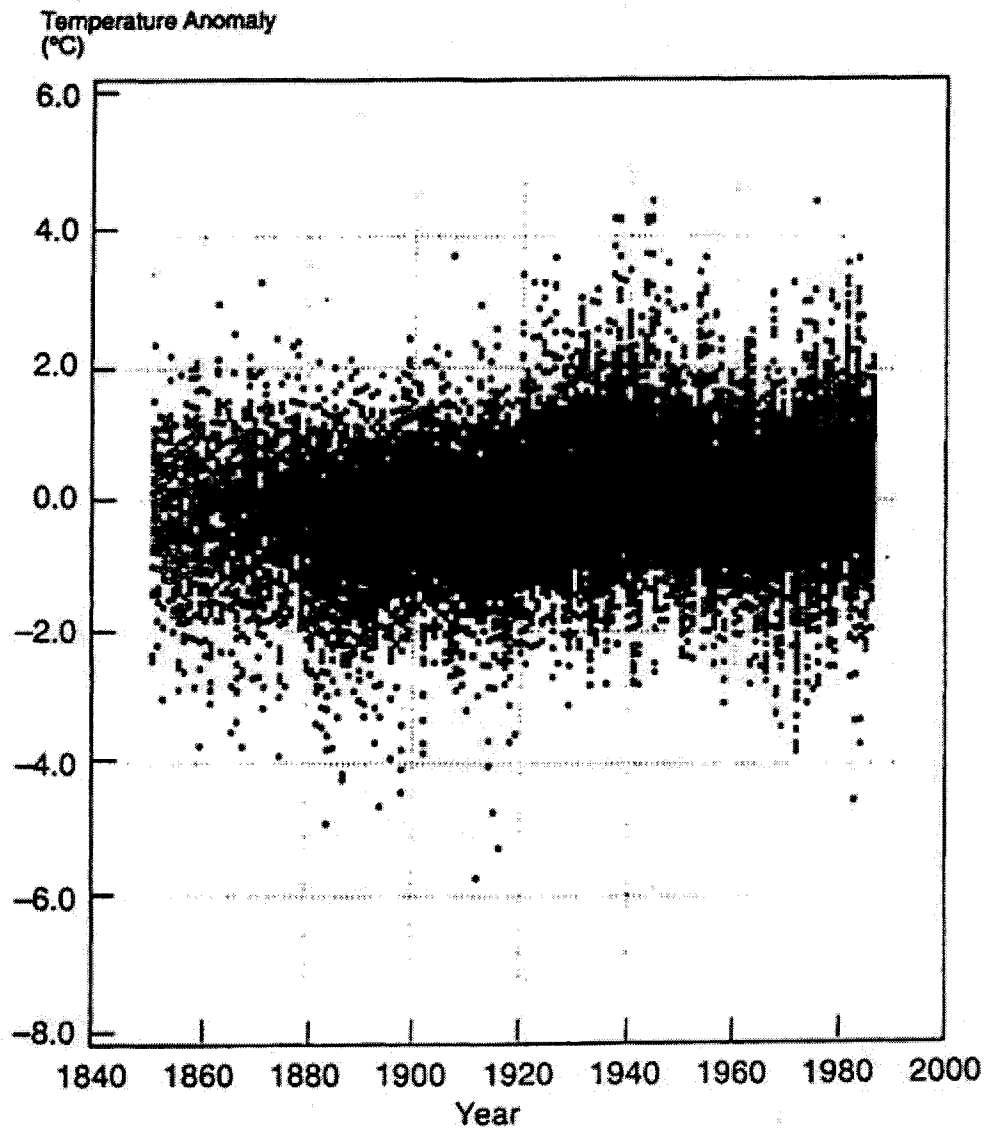
In brief, when we actually go to the scientific literature we see that the 'authoritative' assertions are no more credible than the pathetic picture of the polar bear that accompanied the letter.

3. 'Global Warming' refers to an obscure statistical quantity, globally averaged temperature anomaly, the small residue of far larger and mostly uncorrelated local anomalies.

This quantity is highly uncertain, but may be on the order of 0.7 C over the past 150 years. This quantity is always varying at this level and there have been periods of both warming and cooling on virtually all time scales. On the time scale of from 1 year to 100 years, there is no need for any externally specified forcing. The climate system is never in equilibrium because, among other things, the ocean transports heat between the surface and the depths. To be sure, however, there are other sources of internal variability as well.

Because the quantity we are speaking of is so small, and the error bars are so large, the quantity is easy to abuse in a variety of ways.

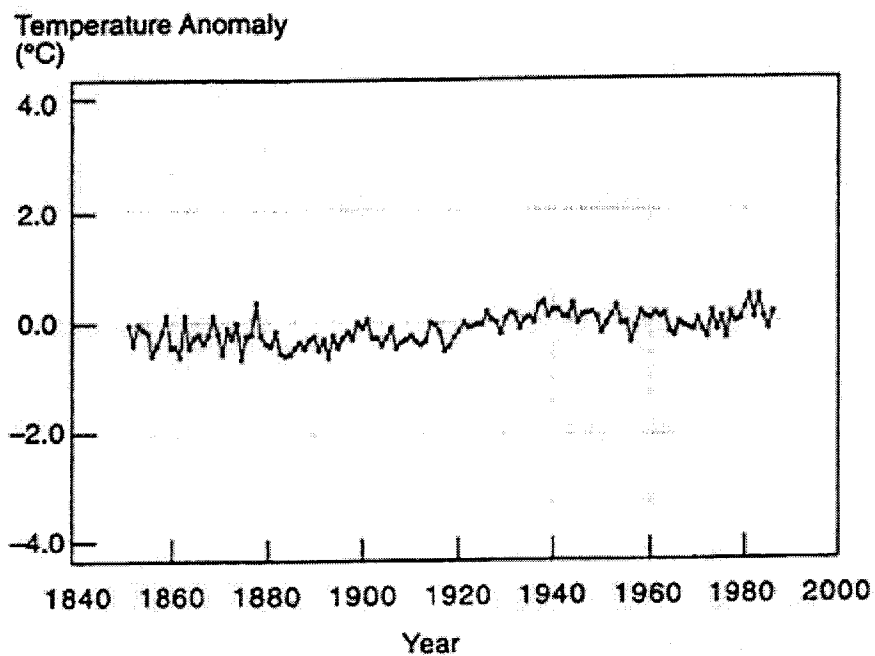
Deviations of Annual Mean Temperature from Long-term Average



1. Data points averaged to obtain time record of global mean temperature. Note points range from less than -2C to more than +2C.

Source: S. L. Grotch, Lawrence Livermore Laboratory, Livermore California

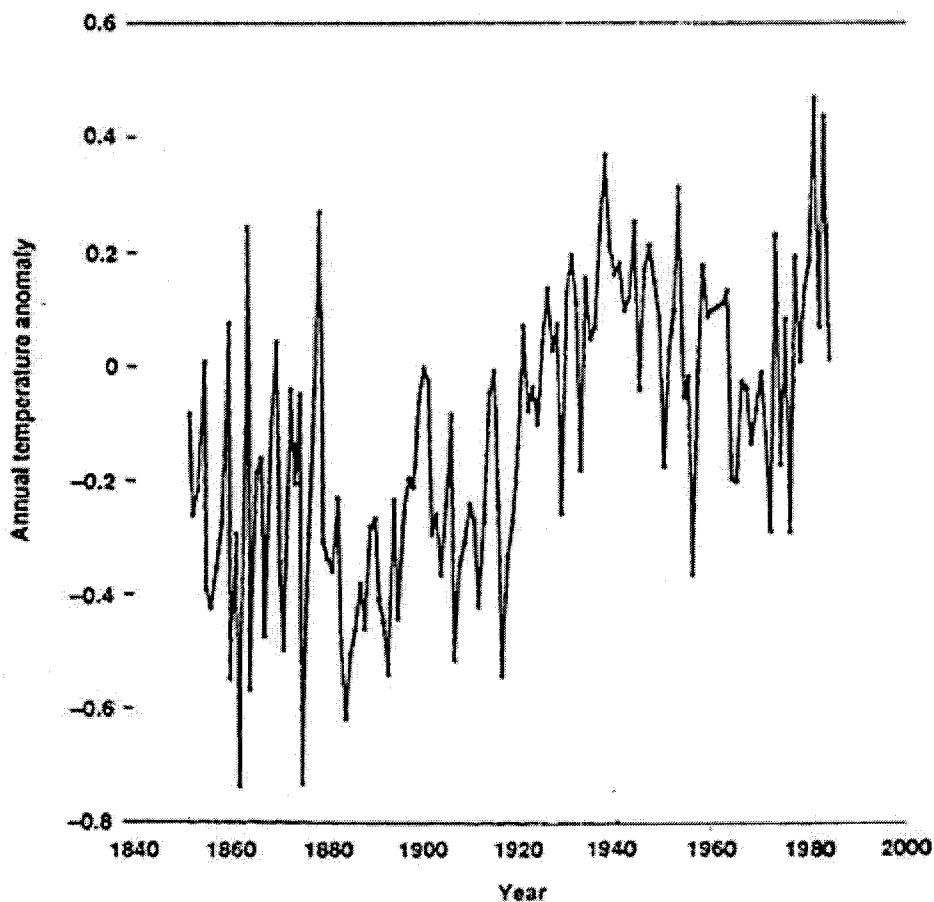
Globally Averaged Deviations from Average Temperature Plotted on a Scale Relevant to the Individual Station Deviations



2. Average of points in previous figure.

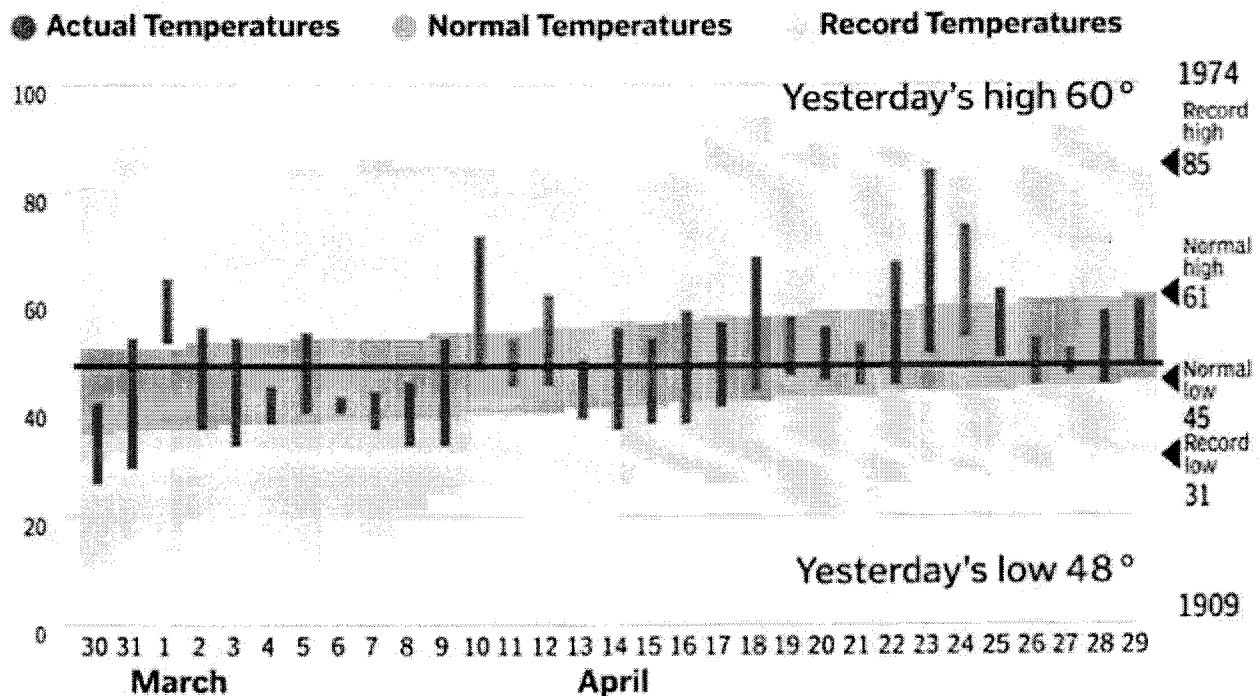
Notice the vertical scale in the above diagrams. Relative to the variability in the data, the changes in the globally averaged temperature anomaly look negligible.

CRU NH Average Annual Anomalies (1851-1984)



**3. Curve in previous figure stretched to fill graph.
Note that range is now from about -0.6C to +0.3C.**

April 30, 2008



The thickness of the red line represents the range of global mean temperature anomaly over the past century.

One month's record of high and low temperatures for Boston.

4. The claims that the earth has been warming, that there is a greenhouse effect, and that man's activities have contributed to warming, are trivially true and essentially meaningless in terms of alarm.

Nonetheless, they are frequently trotted out as evidence for alarm. For example, here is the response of the American Physical Society to Hal Lewis' resignation letter:

- *On the matter of global climate change, APS notes that virtually all reputable scientists agree with the following observations:*
- *Carbon dioxide is increasing in the atmosphere due to human activity;*
- *Carbon dioxide is an excellent infrared absorber, and therefore, its increasing presence in the atmosphere contributes to global warming; and*
- *The dwell time of carbon dioxide in the atmosphere is hundreds of years.*

On these matters, APS judges the science to be quite clear.

The last item is actually quite misleading on its own terms. The APS also denies financial involvement despite the fact that POPA's chair is Bob Socolow who is chair of the Carbon Mitigation Initiative, and on the advisory board of Deutsche Bank.

Two separate but frequently conflated issues are essential for alarm:

- 1) The magnitude of warming, and
- 2) The relation of warming of any magnitude to the projected catastrophe.

When it comes to unusual climate (which always occurs some place), most claims of evidence for global warming are guilty of the 'prosecutor's fallacy.' For example this confuses the near certainty of the fact that if A shoots B, there will be evidence of gunpowder on A's hand with the assertion that if C has evidence of gunpowder on his hands then C shot B.

However, with global warming the line of argument is even sillier. It generally amounts to something like if A kicked up some dirt, leaving an indentation in the ground into which a rock fell and B tripped on this rock and bumped into C who was carrying a carton of eggs which fell and broke, then if some broken eggs were found it showed that A had kicked up some dirt. These days we go even further, and decide that the best way to prevent broken eggs is to ban dirt kicking.

Some current problems with science

1. **Questionable data.** (Climategate and involvement of all three centers tracking global average temperature anomaly.) This is a complicated ethical issue for several reasons. Small temperature changes are not abnormal and even claimed changes are consistent with low climate sensitivity. However, the public has been misled to believe that whether it is warming or cooling –no matter how little –is of vital importance. Tilting the record slightly is thus of little consequence to the science but of great importance to the public perception.
2. More sophisticated data is being analyzed with the aim of supporting rather than testing models (validation rather than testing). That certainly has been my experience during service with both the IPCC and the National Climate Assessment Program. It is also evident in the recent scandal concerning Himalayan glaciers.

(Note that in both cases, we are not dealing with simple measurements, but rather with huge collections of sometimes dubious measurements that are subject to often subjective analysis – sometimes referred to as 'massaging'.')

In point of fact, we know that some of the recent temperature data must be wrong!

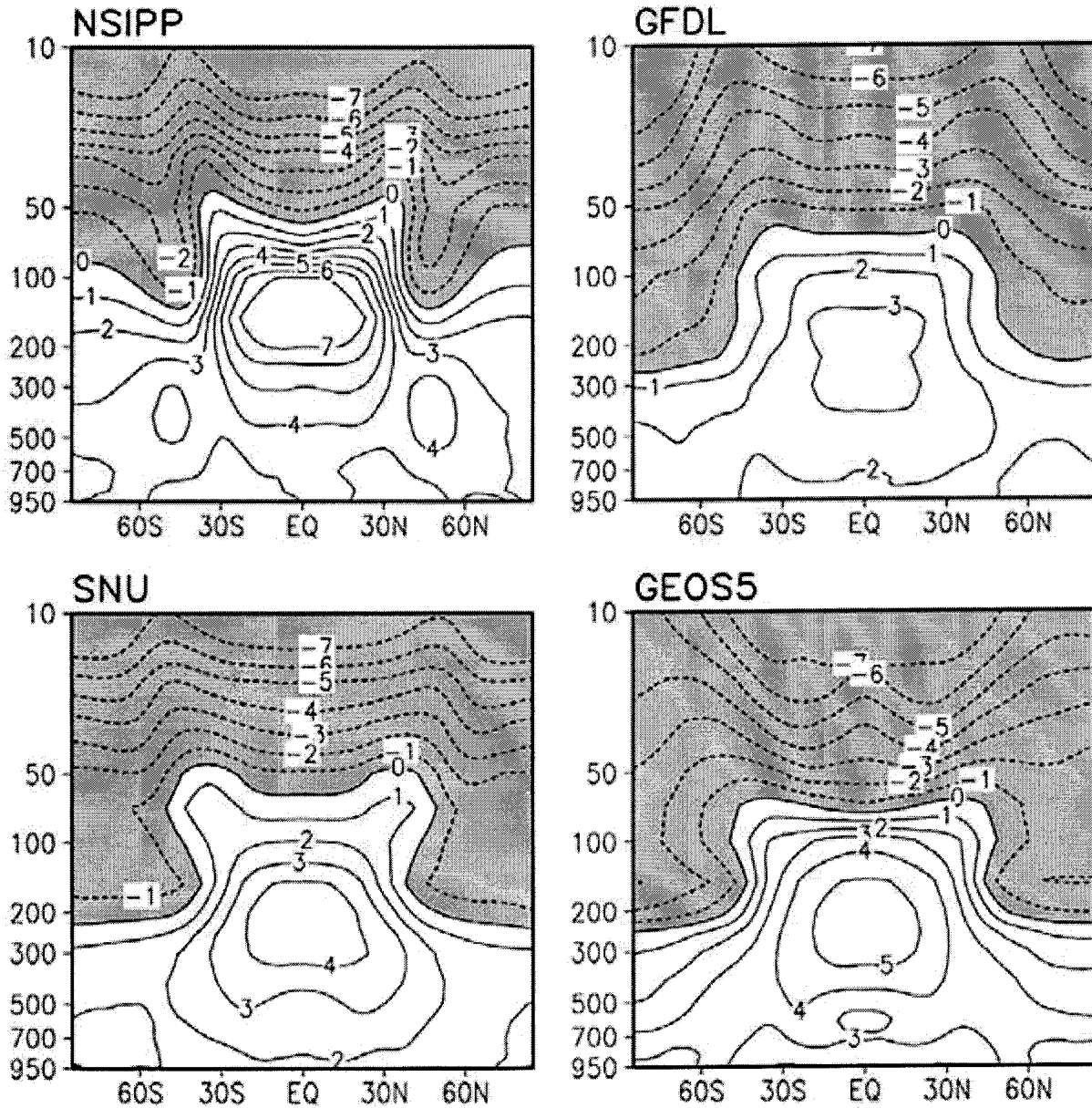


FIG. 14. Zonal-mean distributions of temperature change ($2 \times \text{CO}_2 - \text{Control}$). Units are kelvin.

Here we see the meridional distribution of the temperature response to a doubling of CO_2 from four typical models. The response is characterized by the so-called hot spot (ie, the response in the tropical upper troposphere is from 2-3 times larger than the surface response).

We know that the models are correct in this respect since the hot spot is simply a consequence of the fact that tropical temperatures approximately follow what is known as the moist adiabat. This is simply a consequence of the dominant role of moist convection in the tropics.

However, the temperature trends obtained from observations fail to show the hot spot.

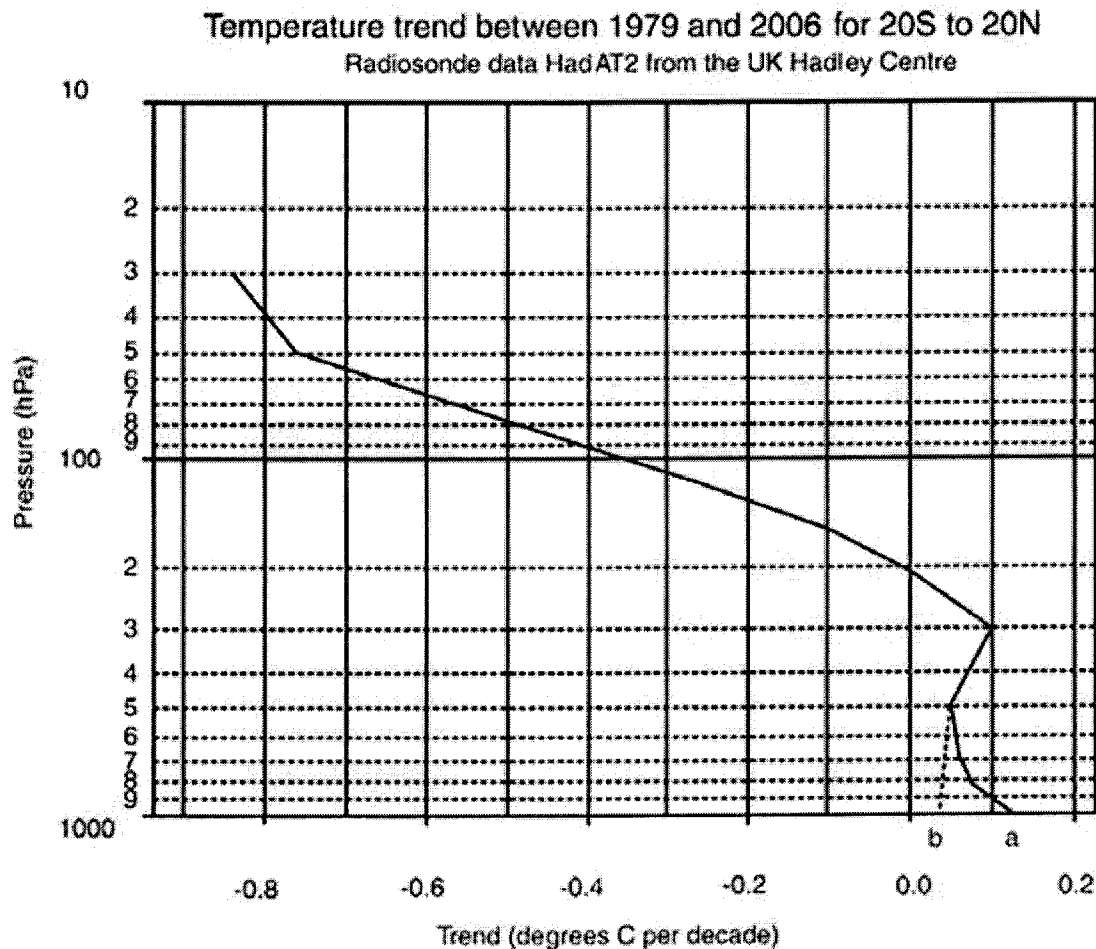


Figure 5: Temperature trend as a function of pressure level for period 1979–2006 in the tropics (20S–20N) based on balloon data analyzed by the Hadley Centre. 'a' shows the observed trend at the surface. 'b' shows that part of the surface trend that can be attributed to greenhouse warming.

The resolution of the discrepancy demands that either the upper troposphere measurements are wrong, the surface measurements are wrong or both. If it is the surface measurements, then the surface trend must be reduced from 'a' to 'b'.

Given how small the trends are, and how large the uncertainties in the analysis, such errors are hardly out of the question.

3. Sensitivity is a crucial issue. This refers to how much warming one expects from a given change in CO₂ (usually a doubling). It cannot be determined by assuming that one knows the cause of change. If the cause is not what one assumes, it yields infinite sensitivity. This problem infects most attempts to infer climate sensitivity from paleoclimate data.

4. Models cannot be tested by comparing models with models. Attribution cannot be based on the ability or lack thereof of faulty models to simulate a small portion of the record. Models are simply not basic physics.

All the above and more are, nonetheless, central to the IPCC reports that supposedly are 'authoritative' and have been endorsed by National Academies and numerous professional societies.

Here is a recent letter signed by the presidents of both the Royal Society and the National Academy of Science.

It tells us a great deal about the current state of science, and the exploitation of authority.

What's happening to the climate is unprecedented

Print

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From Prof Martin Rees and Dr Ralph J. Cicerone

Sir, We were stimulated by your editorial "Cooler on warming" (April 5). There has undoubtedly been a shift in public and media perceptions of climate change – a consequence of, at least in part, leaked e-mails from some climate scientists and the publication of errors in the fourth Intergovernmental Panel on Climate Change report.

However, as your editorial acknowledges, neither recent controversies, nor the recent cold weather, negate the consensus among scientists: something unprecedented is now happening. The concentration of carbon dioxide in the atmosphere is rising and climate change is occurring, both due to human actions. If we continue to depend heavily on fossil fuels, by mid-century CO₂ concentrations will reach double pre-industrial levels. Straightforward physics tells us that this rise is warming the planet. Calculations demonstrate that this effect is very likely responsible for the gradual warming observed over the past 30 years and that global temperatures will continue to rise – superimposing a warming on all the other effects that make climate fluctuate. Uncertainties in the future rate of this rise, stemming largely from the "feedback" effects on water vapour and clouds, are topics of current research.

It is the responsibility of scientific organisations like ours to present the public and politicians with a balanced assessment of the evidence – and, importantly, to indicate the level of confidence and the range of uncertainties attached to them.

Our two science academies have long contributed critical, objective and open reports on climate change. We intend to draw upon the efforts of leading scientists everywhere to make our future reports more accessible and valuable and, by fostering scientific research, we hope to do a better job of reducing inherent uncertainties. We must also promote best scientific practice, especially with regard to the sharing of data. But policymakers and the public must realise that, even if scientific uncertainties could be reduced to zero, formulating effective political responses would still be controversial and challenging. Our academies will provide the scientific backdrop for the political and business leaders who must create effective policies to steer the world toward a low-carbon economy.

Martin Rees,
President of the Royal Society

Ralph J Cicerone,
President of the US National Academy of Sciences

Let us focus on three sentences in this letter.

1. *However, as your editorial acknowledges, neither recent controversies, nor the recent cold weather, negate the consensus among scientists: something unprecedented is now happening. The concentration of carbon dioxide in the atmosphere is rising and climate change is occurring, both due to human actions.*

Note that this statement seems to go well beyond the IPCC statement that claimed that only more than half the temperature change over the preceding 50 years could be attributed to man's

emissions –with aerosols included in order to cancel much of the excess warming the models produce.

Moreover, the assumptions underlying this claim have been shown to be false (namely that all other possible causes had been adequately accounted for).

Of course, one could carefully parse the sentence. Perhaps they meant that there was increasing CO₂ due to man, and that there was warming due to this though it might only be a small part of the already small observed warming. If this is what they meant, then the statement is trivial and suggests no basis for alarm. However, there is no doubt that this is not what they intended the reader to infer.

2. Uncertainties in the future rate of this rise, stemming largely from the “feedback” effects on water vapour and clouds, are topics of current research.

Who would guess from this throw away comment, that feedbacks are the critical issue? Without strong positive feedbacks there would be no cause for alarm, and no need for action. What Rees and Cicerone are actually saying is that we don’t know if there is a problem.

3. Our academies will provide the scientific backdrop for the political and business leaders who must create effective policies to steer the world toward a low-carbon economy.

Rees and Cicerone are saying that regardless of the evidence the answer is predetermined. If the government wants carbon control, that is the answer that the Academies will provide. Nothing could better epitomize the notion of science in the service of politics –something that, unfortunately, has characterized so-called climate science.

Where do we go from here?

Given that this has become a quasi-religious issue, it is hard to tell. However, my personal hope is that we will return to normative science, and try to understand how the climate actually behaves.

Our present approach of dealing with climate as completely specified by a single number, globally averaged surface temperature anomaly, that is forced by another single number, atmospheric CO₂ levels, for example, clearly limits real understanding; so does the replacement of theory by model simulation.

In point of fact, there has been progress along these lines and none of it demonstrates a prominent role for CO₂.

It has been possible to account for the cycle of ice ages simply with orbital variations (as was thought to be the case before global warming mania); tests of sensitivity independent of the assumption that warming is due to CO₂ (a circular assumption) show sensitivities lower than models show; the resolution of the early faint sun paradox which could not be resolved by greenhouse gases, is readily resolved by clouds acting as negative feedbacks.

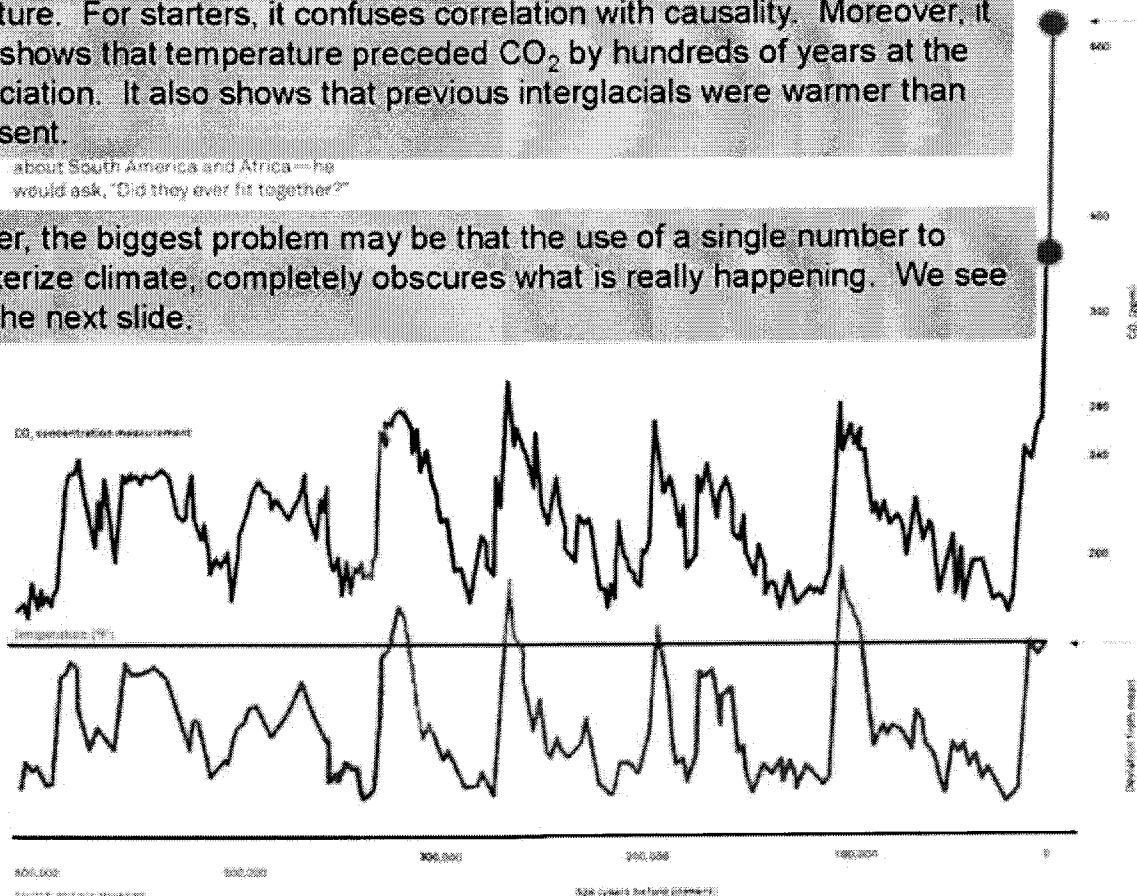
So far we have approached the science in a somewhat peripheral way. In the remainder of this testimony, we will deal with the science more directly.

Here is a graphic made famous by Al Gore. There are lots of problems with this picture. For starters, it confuses correlation with causality. Moreover, it clearly shows that temperature preceded CO₂ by hundreds of years at the last glaciation. It also shows that previous interglacials were warmer than the present.

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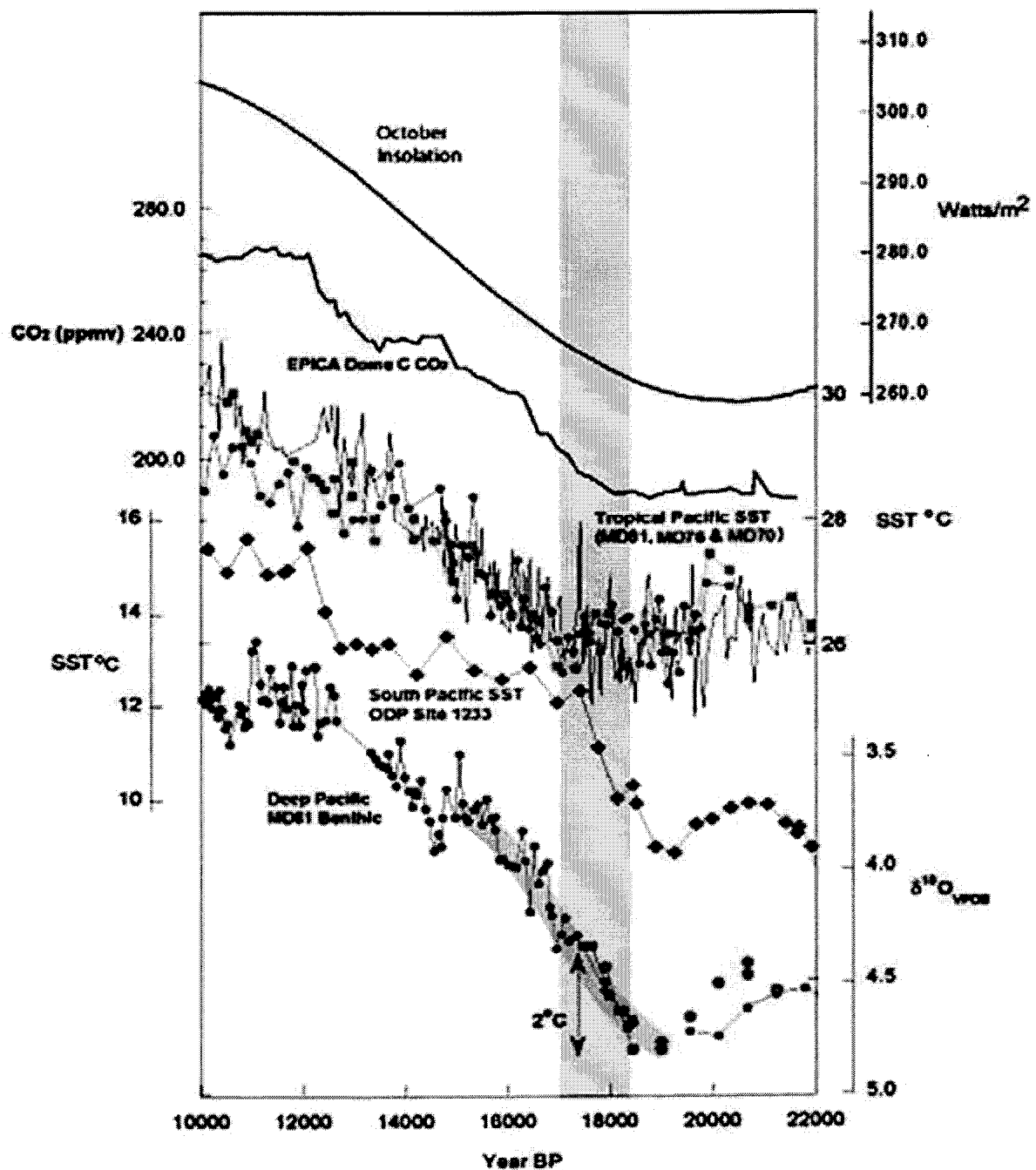
about South America and Africa—he would ask, “Did they ever fit together?”

However, the biggest problem may be that the use of a single number to characterize climate, completely obscures what is really happening. We see this in the next slide.



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Here is why it is often useless to consider merely global mean temperature anomaly and CO₂.

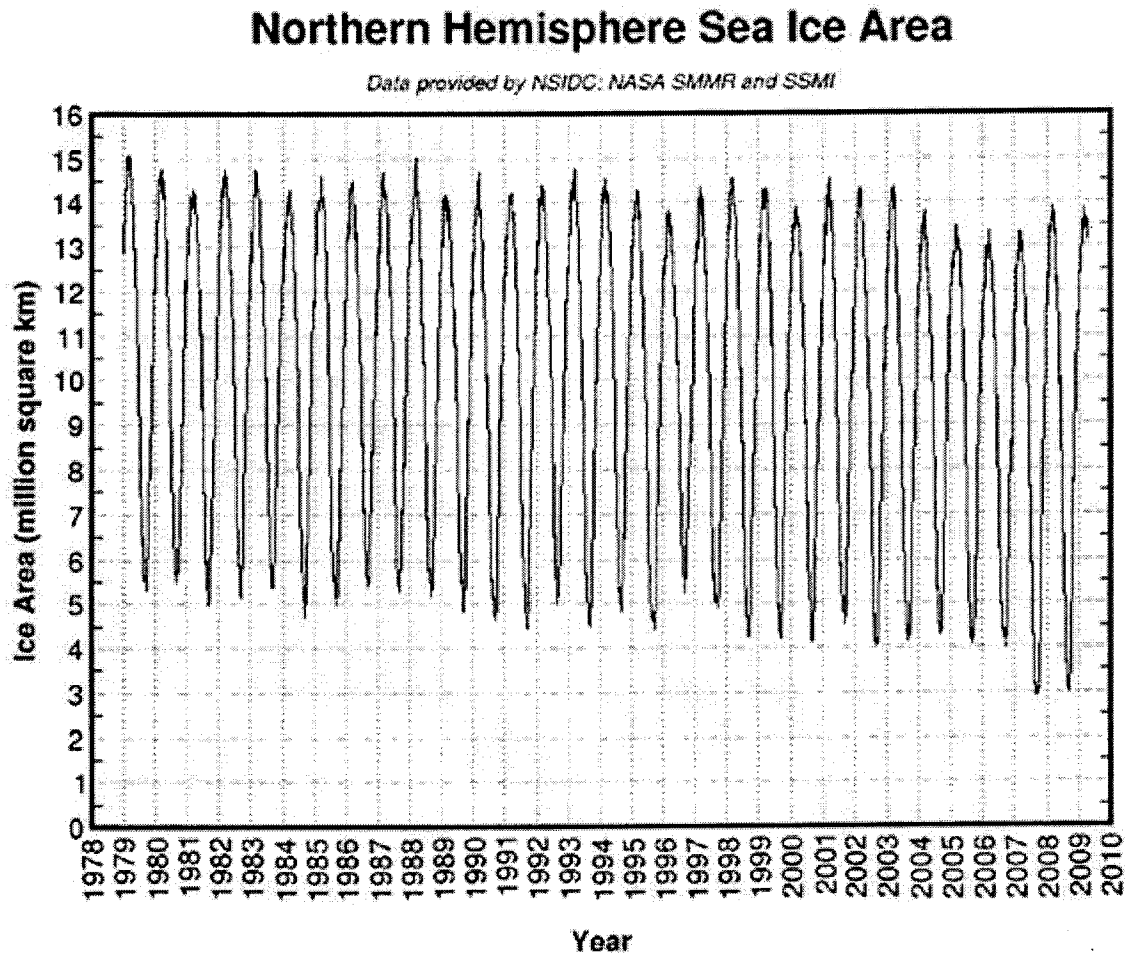


According to Stott et al, warming first occurred in the South Pacific in the region of formation of Upper Circumpolar Deep Water between 19,000BP and 17,000 BP. It was not until about 17,000 BP that the tropical surface water began to warm and the CO₂ concentration also began to rise at this time. It was not until 15,000BP that the Greenland region began to warm.

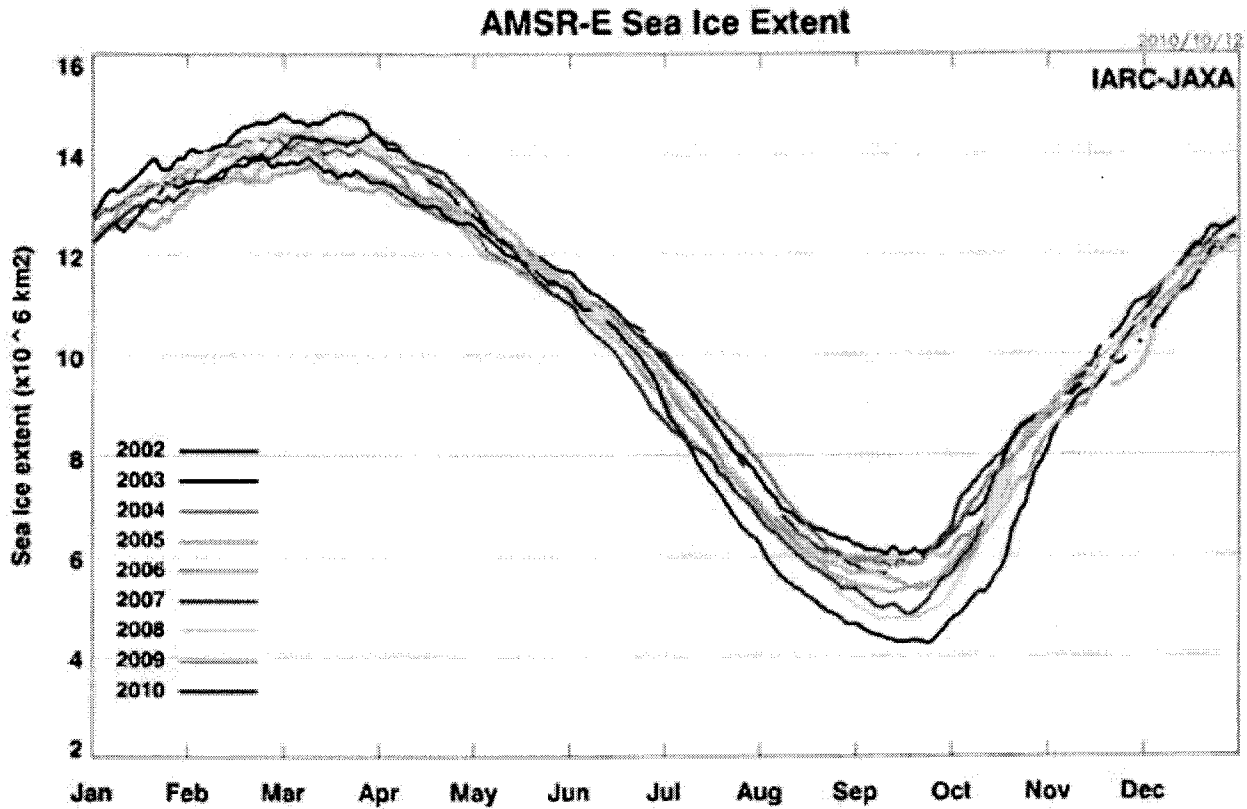
With such a sequence it is apparent that the interglacial warming was initiated in the waters of the Southern Ocean and took nearly 4,000 years to be reflected in Greenland changes; also, the CO₂ variations would seem to be tied to tropical ocean temperature changes.

Here is a simple example of how current approaches inhibit progress.

You have all heard about the arctic sea ice disappearing. Here is what is being spoken of.



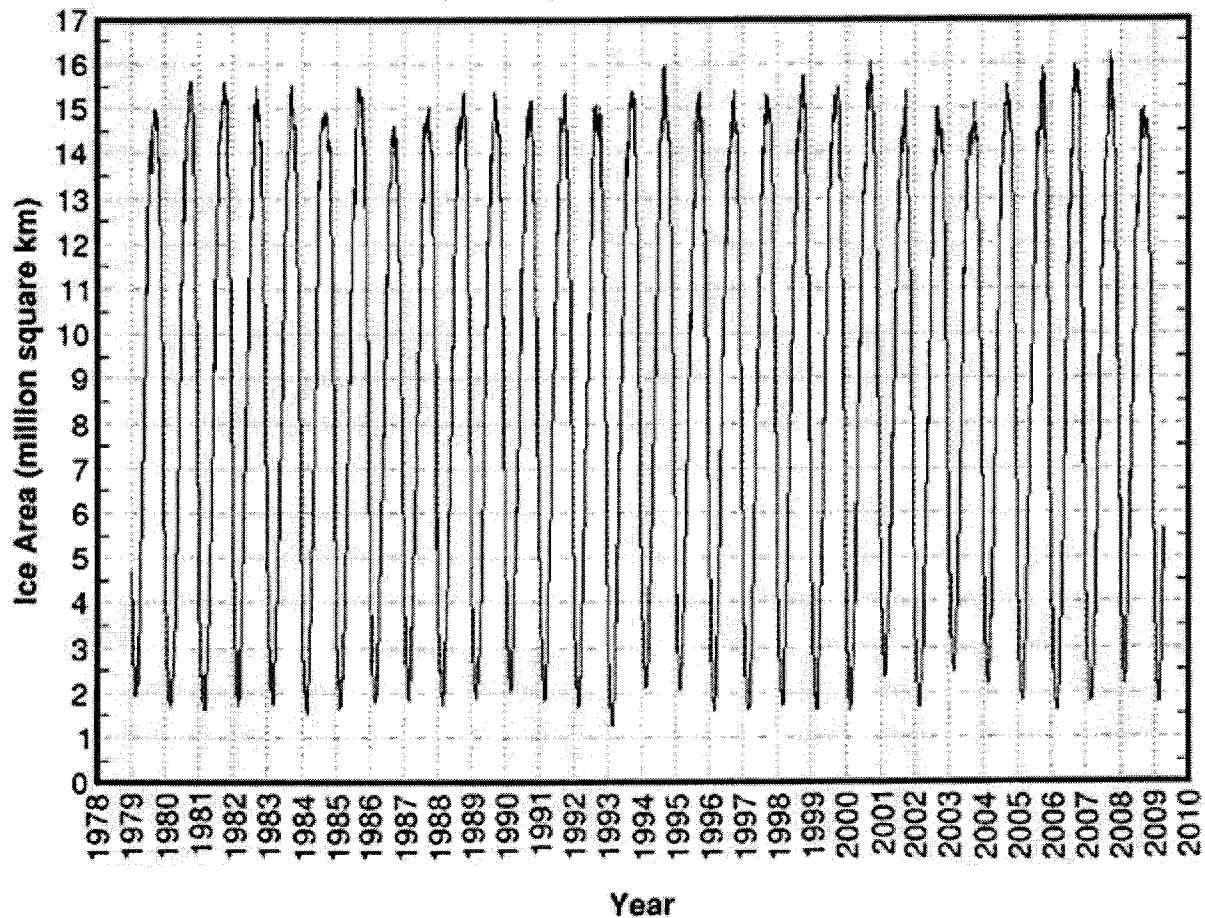
The latest value: 6,599,688 km² (October 11, 2010)



As you may have heard, nothing of the sort has been happening to Antarctic sea ice, although claims of record extent of Antarctic sea ice are also overly dramatic.

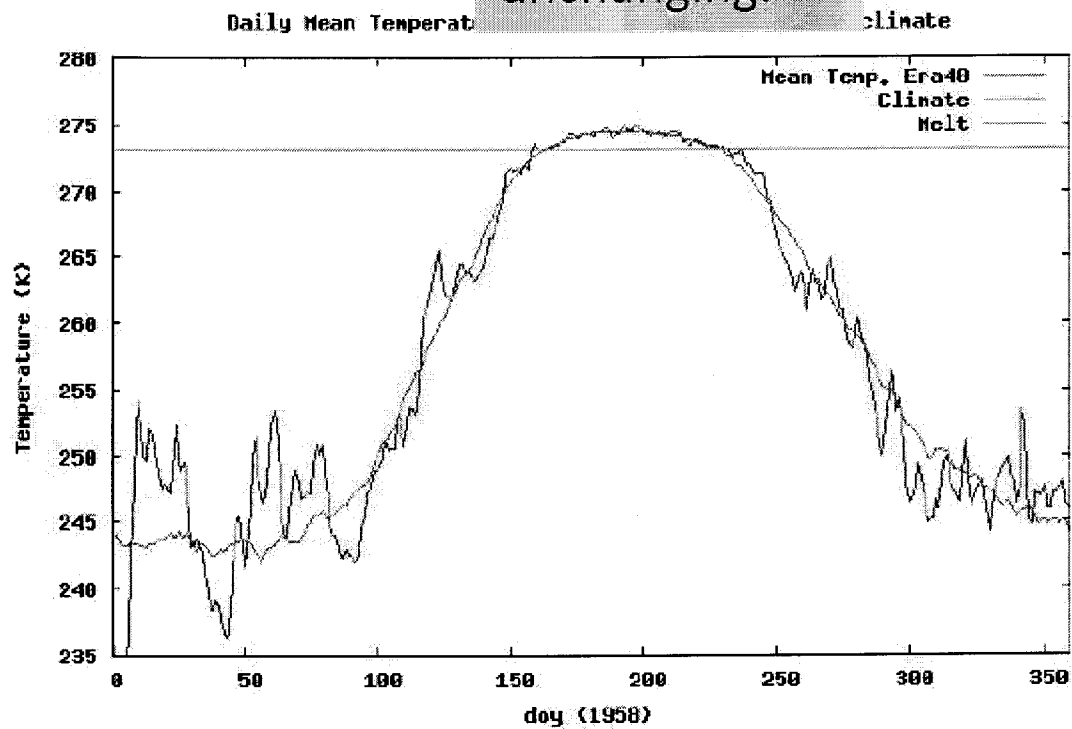
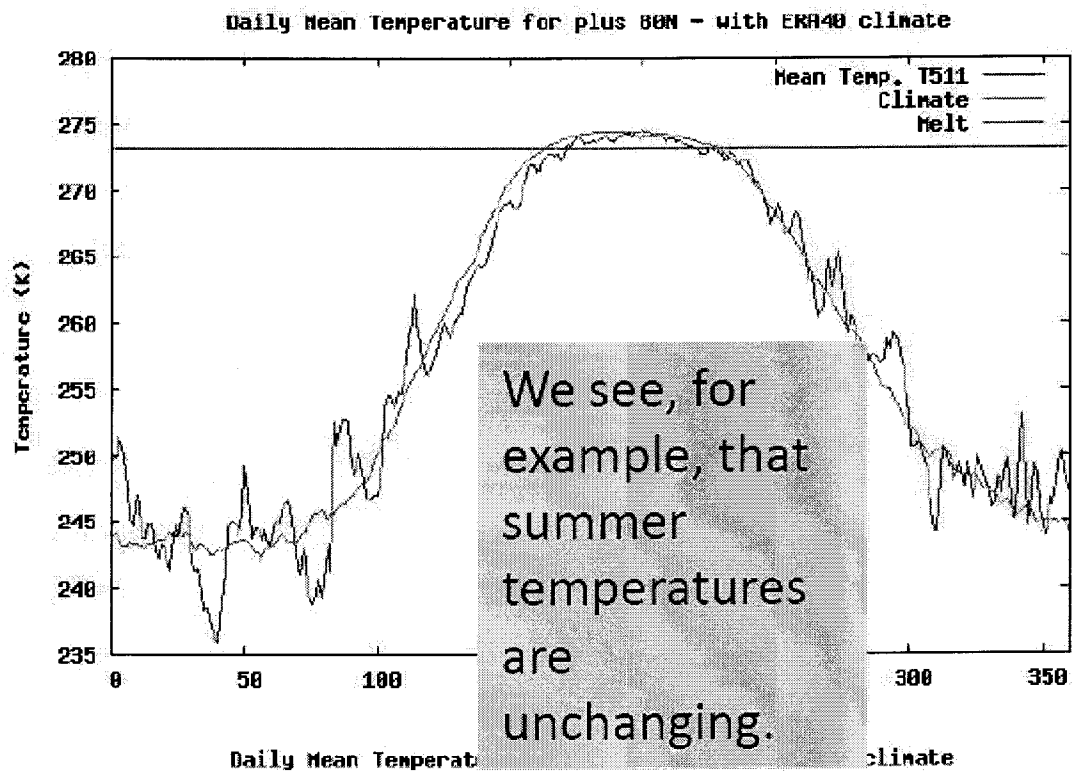
Southern Hemisphere Sea Ice Area

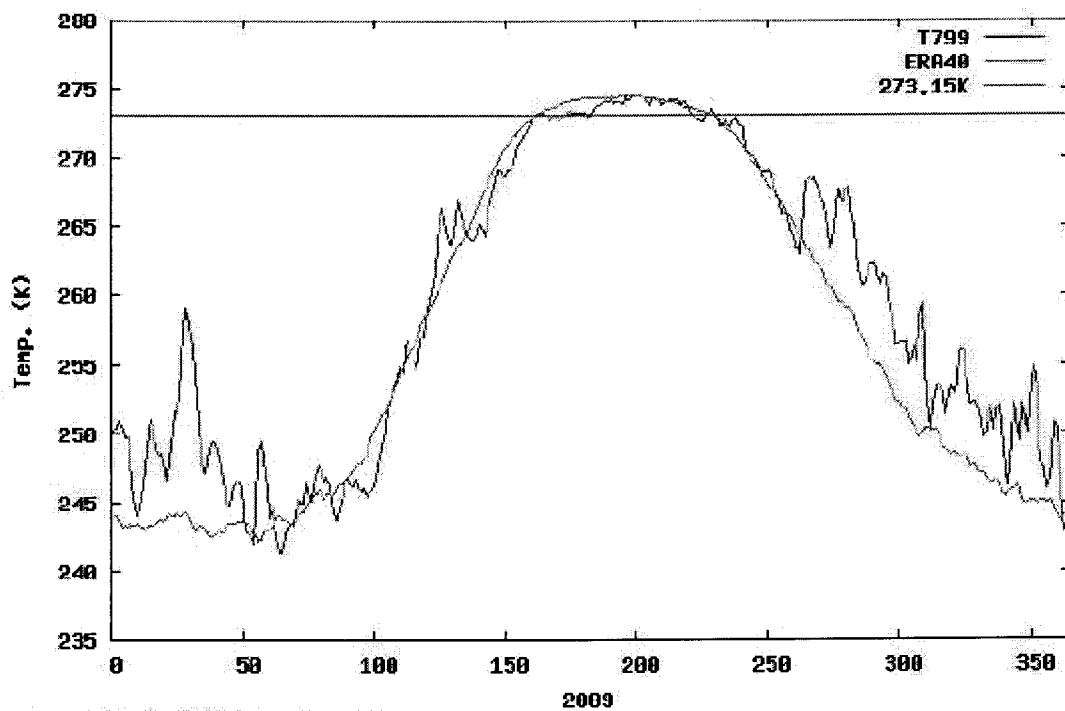
Data provided by NSIDC, NASA SMMR and SSM/I



Let us now look at the temperature of polar regions in some detail. The following figures show daily arctic temperatures for each day available from re-analysis since 1958. They also show the average temperatures for each day.

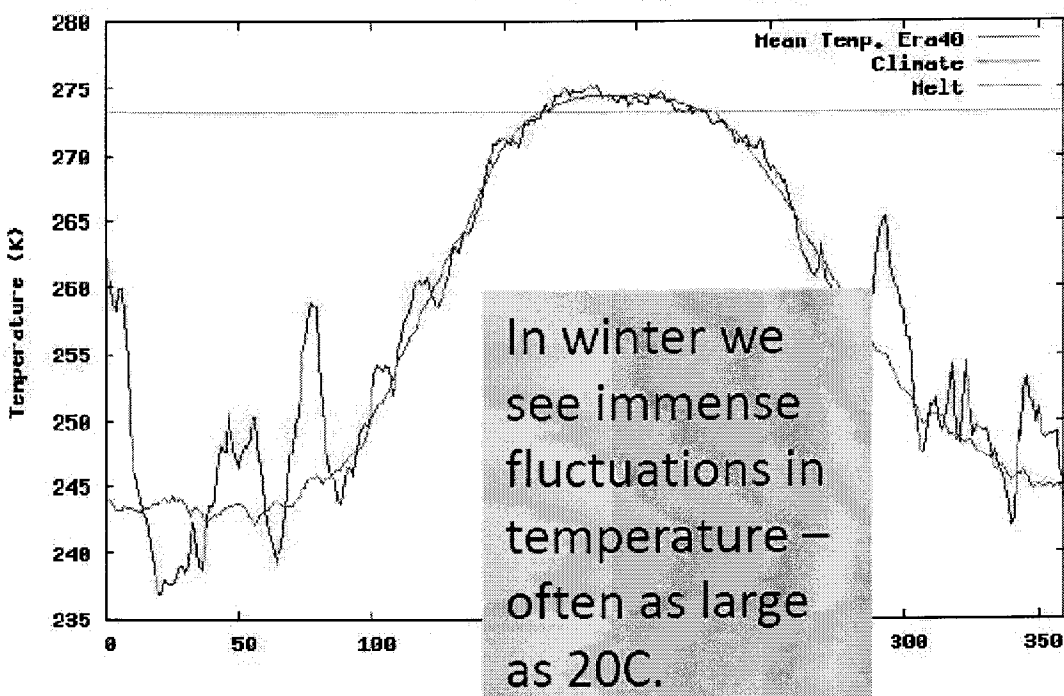
If one focuses on variations in annually averaged temperatures, one misses some crucial information, and that information tells us quite a lot.



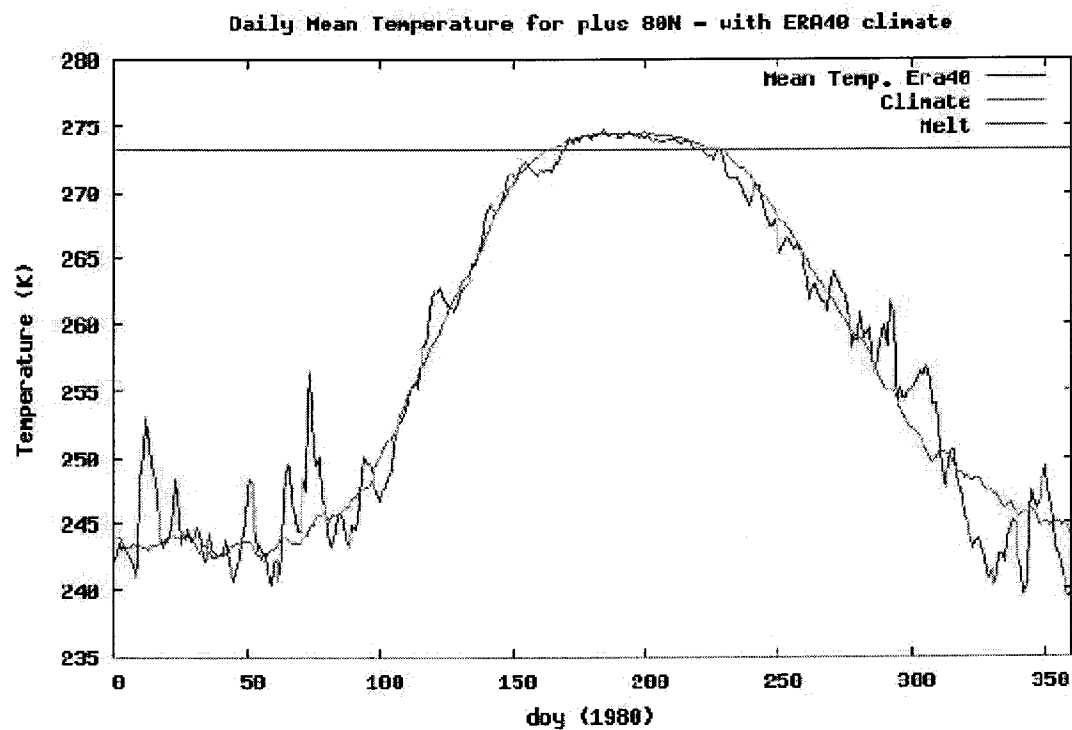
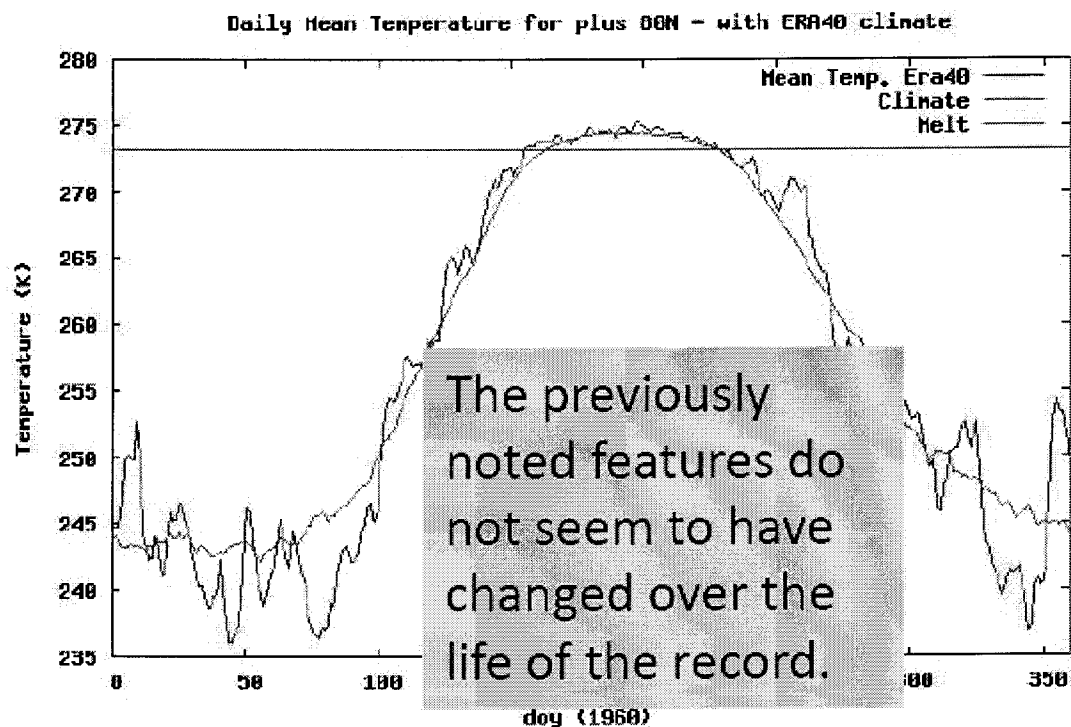


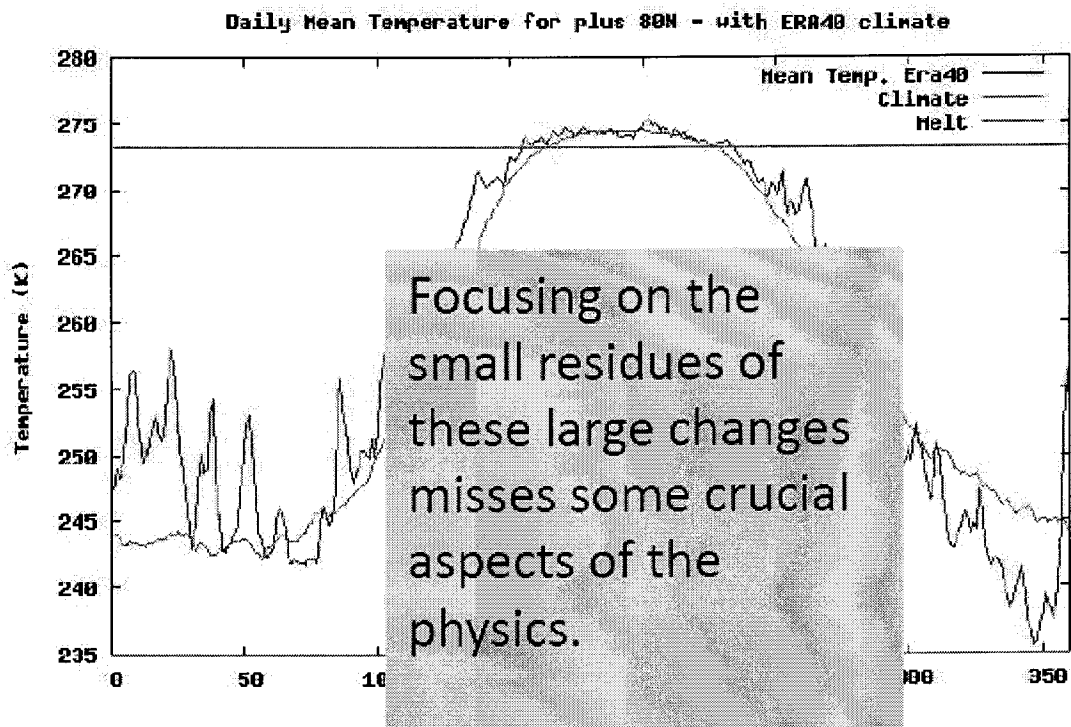
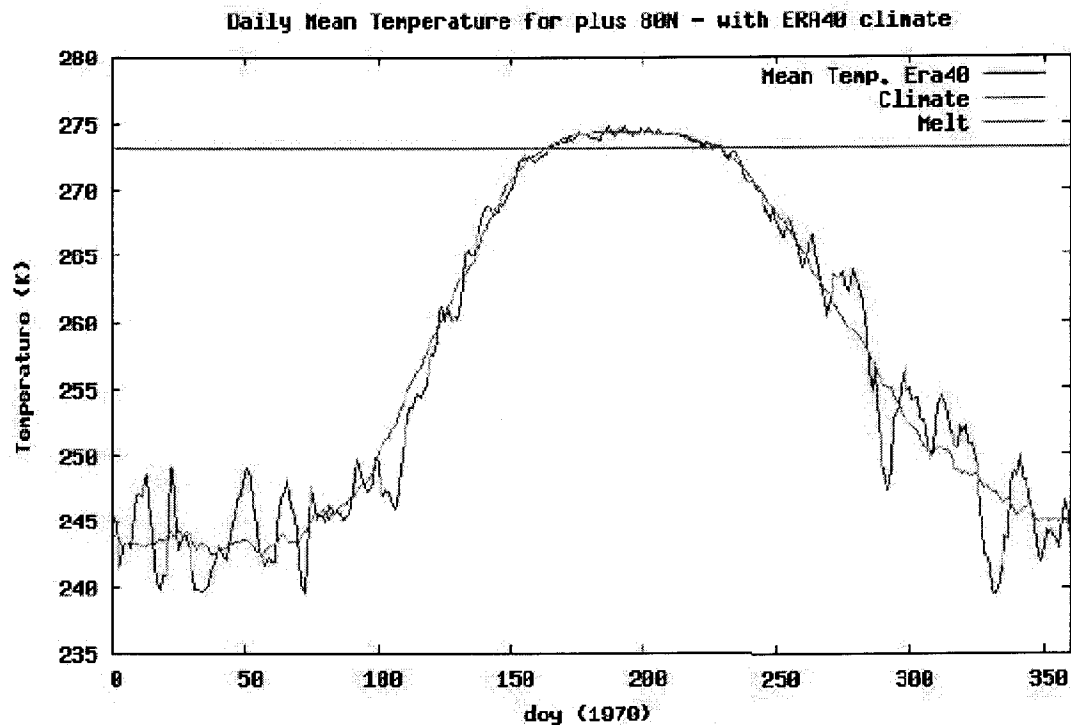
Sun Jan 3 19:00:05 GMT 2010

Daily Mean Temperature for plus 80N - with ERA40 climate



The previously noted features do not seem to have changed over the life of the record.





Focusing on the small residues of these large changes misses some crucial aspects of the physics.

What the previous slides illustrate is that during summers, when there is sunlight, temperatures are largely determined by local radiative balance and this does not seem to be changing.

However, during the winter night, temperatures would be even colder than they are but for the transport of heat from lower latitudes. This transport is by the turbulent eddies or storms. Understanding arctic temperatures must involve understanding why these storms erratically penetrate to the arctic.

Judging from the behavior of summer temperatures, CO2 is not obviously a major player.

Just for the record, summer ice depends mostly on how much is blown out of the arctic basin – something that used to be textbook information.

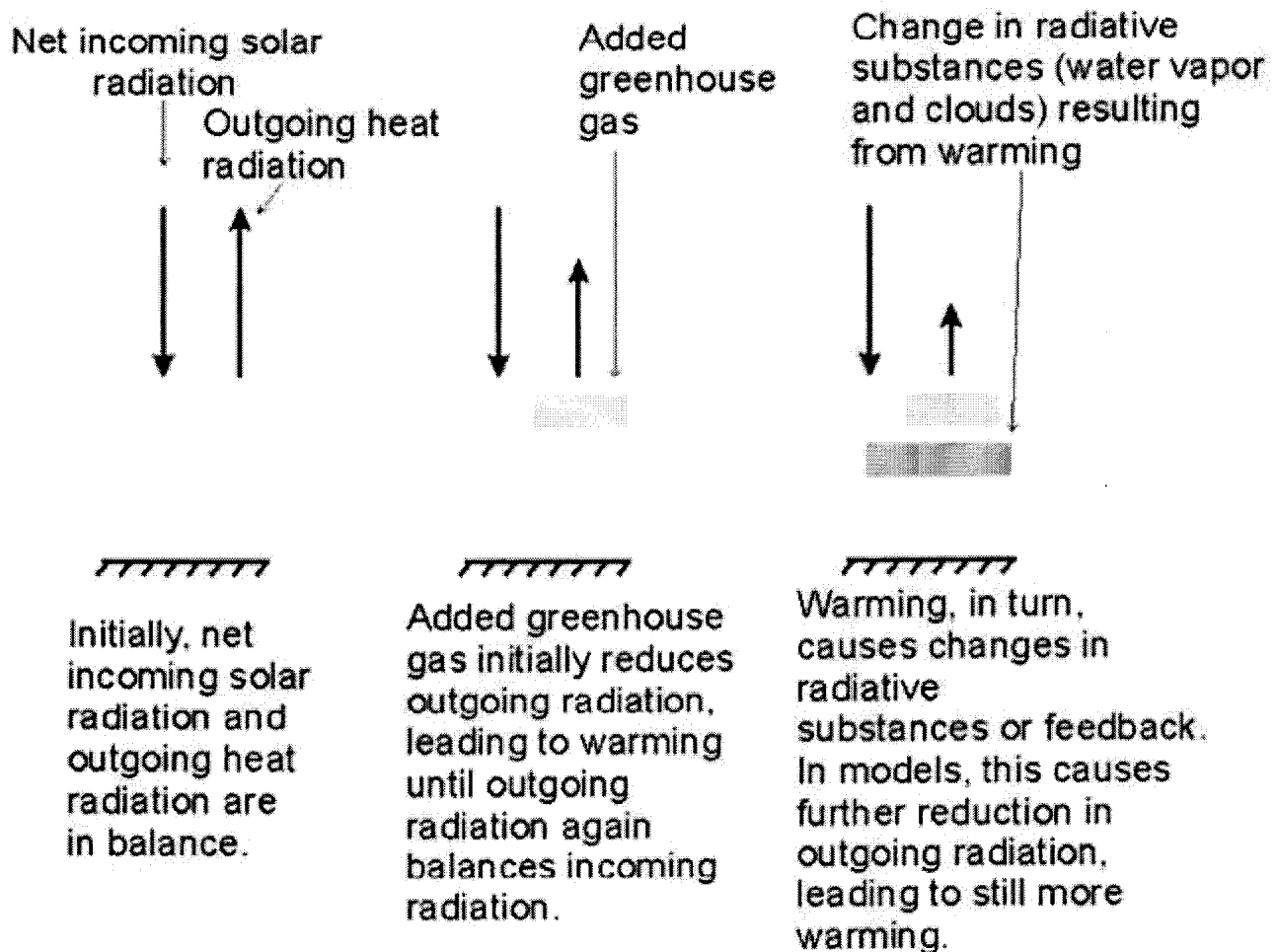
The arctic ocean is warming up, icebergs are growing scarcer and in some places the seals are finding the water too hot. Reports all point to a radical change in climate conditions and hitherto unheard-of temperatures in the arctic zone. Expeditions report that scarcely any ice has been met with as far north as 81 degrees 29 minutes. Great masses of ice have been replaced by moraines of earth and stones, while at many points well known glaciers have entirely disappeared. – US Weather Bureau, 1922

In fact, the arctic is notoriously variable; similar statements are available for 1957, and the Skate surfaced at the N. Pole in 1959. So much for ‘unprecedented.’

While there really doesn’t appear to be that much going on, anecdotal information can be more dramatic.

As already mentioned, it is essential to know climate sensitivity. Model predictions depend on positive feedbacks and not just the modest effect of CO2. There follows a schematic of what we mean by feedbacks.

Feedback Schematic



One is able to use satellite data from ERBE and CERES (that measures net outgoing radiation in both the visible and infrared portions of the spectrum) to test the preceding situation, and to quantitatively evaluate climate feedback factors. These are related to climate sensitivity by the following equation:

$$\Delta T = \frac{\Delta T_0}{1 - f},$$

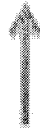
ΔT_0 is the zero feedback response to a doubling of CO₂. It is about 1C.

The basis of the approach is to see if the satellite measured outgoing radiation associated with short term fluctuations in Sea Surface Temperature (SST) is larger or smaller than what one gets for zero feedback. Remember that a positive feedback will lead to less outgoing radiation (increased blanket) while a negative feedback will lead to more.

It turns out that the model intercomparison program has the models used by the IPCC, forced by actual SST, calculate outgoing radiation. So one can use the same approach with models, while being sure that the models are subject to the same surface temperature fluctuations that applied to the observations.

Feedbacks as measured by ERBE and CERES (after corrections described by Trenberth et al, 2009). Mean \pm -standard error of the variables.

	Variables	Value	Comments for likely lag
a	Slope, LW	5.2 \pm 1.3	Lag = 1
b	Slope, SW	2.2 \pm 3.0	Lag = 3
c	Slope, Total	7.1 \pm 2.2	= a+b for the same SST interval
d	f _{LW}	-0.3 \pm 0.2	Calculated from a
e	f _{SW}	-0.3 \pm 0.4	Calculated from b
f	f _{Total}	-0.6 \pm 0.3	Calculated from c



Note that feedbacks are negative.

Lags are used to distinguish fluctuations caused by SST (ie feedbacks) from radiation changes that are not feedbacks (due to volcanic eruptions for example).

	N	LW					SW					LW+SW				
		Slope	R	SE	f _{LW}		Slope	R	SE	f _{SW}		Slope	R	SE	f	
CCSM3	19	1.5	0.4	1.8	0.3		-3.1	-0.5	2.2	0.5		-1.6	-0.3	2.7	0.7	
ECHAM5/MPI-OM	18	2.8	0.6	1.7	0.1		-1.1	-0.2	3.1	0.2		1.7	0.3	3	0.2	
FGOALS-g1.0	18	-0.2	-0.1	1.6	0.5		-2.8	-0.7	1.3	0.4		-3	-0.7	1.6	1	
GFDL-CM2.1	18	1.5	0.6	1	0.3		-0.4	-0.1	2.8	0.1		1.1	0.2	2.5	0.3	
GISS-ER	22	2.9	0.6	1.4	0.1		-3.3	-0.5	2.3	0.5		-0.5	-0.1	1.8	0.6	
INM-CM3.0	24	2.9	0.6	1.5	0.1		-3.1	-0.6	1.7	0.5		-0.3	-0.1	1.9	0.5	
IPSL-CM4	22	-0.4	-0.1	2.1	0.6		-2.6	-0.5	2	0.4		-3	-0.5	2.1	0.9	
MRI-CGCM2.3.2	22	-1.1	-0.2	2.2	0.7		-3.9	-0.4	3.1	0.6		-5	-0.6	2.6	1.2	
MIROC3.2(hires)	22	0.7	0.1	2.2	0.4		-2.1	-0.5	1.6	0.3		-1.4	-0.3	2.5	0.7	
MIROC3.2(medres)	22	4.4	0.7	1.8	-0.2		-5.3	-0.7	2.3	0.8		-0.9	-0.2	1.9	0.6	
UKMO-HadGEM1	19	5.2	0.7	2.2	-0.3		-5.9	-0.7	2.1	0.9		-0.8	-0.1	2.2	0.6	



Note that much of the 'error' in the regressions arises because radiatively important factors like clouds and aerosols vary due to many factors apart from SST. For observations there is also instrumental error, though relative errors over short time scales are likely to small.

For all models, the feedbacks are positive.

We see that all the models are characterized by positive feedback factors (associated with amplifying the effect of changes in CO₂), while the satellite data implies that the feedback should be negative. Similar results are being obtained by Roy Spencer.

This is not simply a technical matter. Without positive feedbacks, doubling CO₂ only produces 1C warming. Only with positive feedbacks from water vapor and clouds does one get the large warmings that are associated with alarm. What the satellite data seems to show is that these positive feedbacks are model artifacts.

This becomes clearer when we relate feedbacks to climate sensitivity (ie the warming associated with a doubling of CO₂).

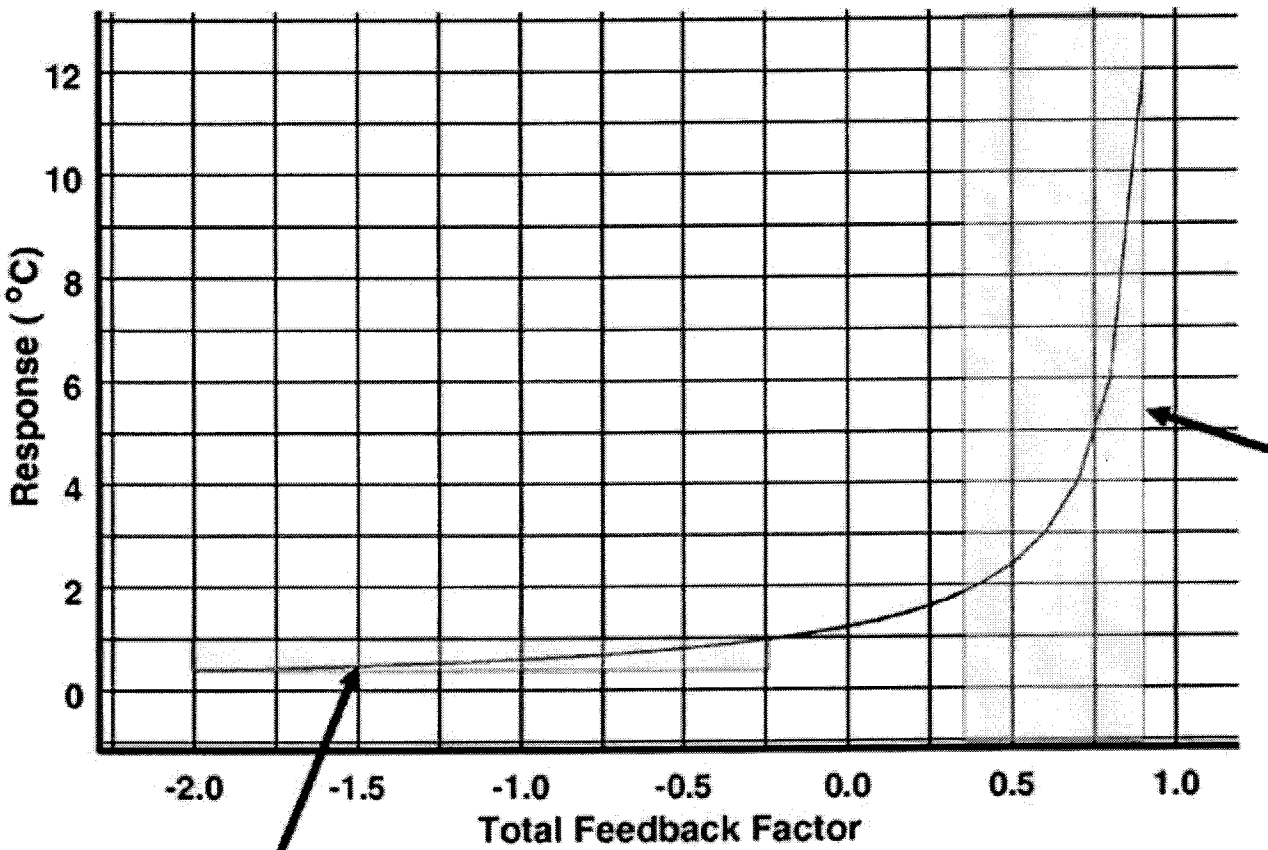
Models

Models	AR4 sensitivity	Sensitivity, mean	Sensitivity, 90%	Sensitivity, 95%
CCSM3	2.7	4.2	1.2 – Infinity	1.0 – Infinity
ECHAM5/MP I-OM	3.4	1.4	0.7 – 28.9	0.7 – Infinity
FGOALS-g1.0	2.3	22.4	2.4 – Infinity	2.1 – Infinity
GFDL-CM2.1	3.4	1.6	0.9 – 15.4	0.8 – Infinity
GISS-ER	2.7	2.5	1.2 – Infinity	1.1 – Infinity
INM-CM3.0	2.1	2.4	1.2 – Infinity	1.1 – Infinity
IPSL-CM4	4.4	19.5	1.9 – Infinity	1.6 – Infinity
MRI- CGCM2.3.2	3.2	Infinity	2.8 – Infinity	2.2 – Infinity
MIROC3.2(hir es)	4.3	3.8	1.2 – Infinity	1.1 – Infinity
MIROC3.2(m edres)	4	3.0	1.3 – Infinity	1.2 – Infinity
UKMO- HadGEM1	4.4	2.8	1.2 – Infinity	1.1 – Infinity

Observations

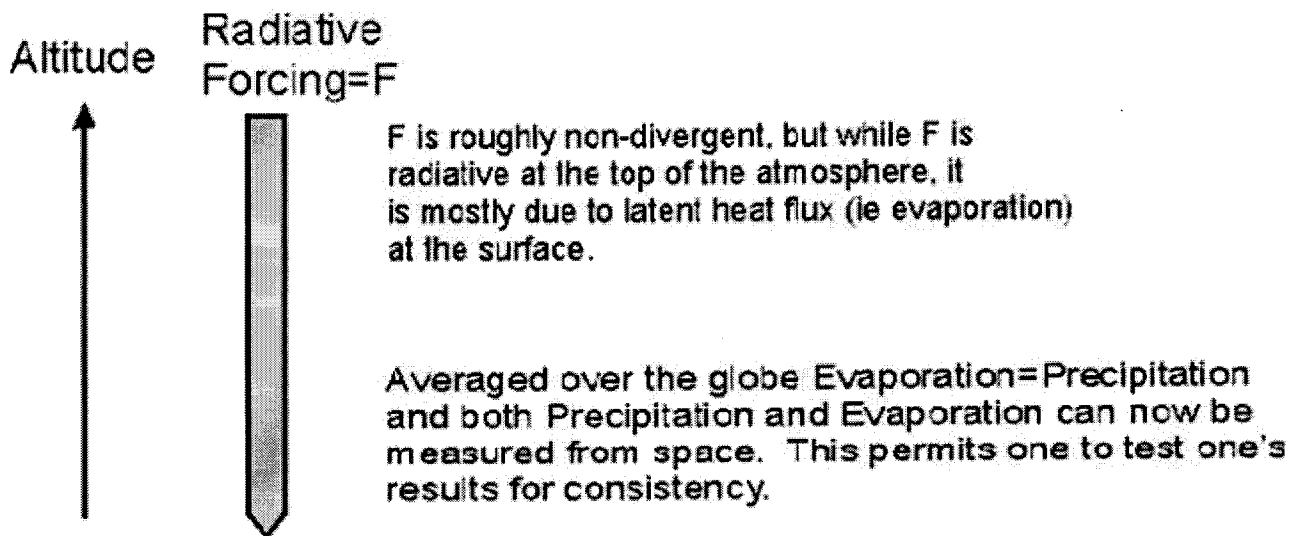
Sensitivity, mean	0.7	Calculated from f
Sensitivity, 90%	0.5-1.1	Twice standard error
Sensitivity, 95%	0.5-1.2	3 times standard error

Response as a function of Total Feedback Factor



For negative feedbacks, large variations in the feedback lead to only small changes in response.

For positive feedbacks, relatively small variations in feedback lead to large changes in response. It is the positive feedbacks in the models that leads to the uncertainty.



From the above, we see that an alternative to observing outgoing radiation from space is to measure evaporation from the surface. This has, in fact, been done.

Wentz, F.J. et al (How much more rain will global warming bring. *ScienceExpress*, 31 May 2007) used the above and space based observations to measure how evaporation changed with temperature and compared their results with GCM results.

In GCMs, E (evaporation) increased from 1-3% for each degree increase in temperature. Observationally, E increased 5.7%. Now a 1% change in E corresponds to about 0.8 watts m⁻². Climate sensitivity is essentially $\Delta T / \Delta F$.

$EC = \Delta \text{Evaporation} / \Delta T$ (in units of percent change per degree)

$CF = \text{Radiative Forcing due to doubling of CO}_2 = 3.6 \text{ Watts m}^{-2}$

$FL = \text{Heat Flux associated with EC} = 0.8 \text{ Watts m}^{-2} \times EC$

Climate sensitivity = CF / FL

Source	EC (percent change in E per degree)	Climate Sensitivity (degrees Centigrade)
Model Range	1	4.5
	3	1.5
Observed	5.7	0.8

We may reasonably consider the observed sensitivity to be an overestimate since Wentz et al explicitly rejected observations that were 'too' far from models. The results are, however, very similar to those based on measurements of outgoing radiation.

Discussion of other progress in science can also be discussed if there is any interest. Our recent work on the early faint sun may prove particularly important. 2.5 billion years ago, when the sun was 20% less bright (compared to the 2% change in the radiative budget associated with doubling CO₂), evidence suggests that the oceans were unfrozen and the temperature was not very different from today's.

No greenhouse gas solution has worked, but a negative cloud feedback does.

You now have some idea of why I think there won't be much warming due to CO₂, and without significant global warming, it is impossible to tie catastrophes to such warming. Even with significant warming it would have been extremely difficult to make this connection.

Perhaps we should stop accepting the term, 'skeptic.' Skepticism implies doubts about a plausible proposition. Current global warming alarm hardly represents a plausible proposition.

Twenty years of repetition and escalation of claims does not make it more plausible.

Quite the contrary, the failure to improve the case over 20 years makes the case even less plausible as does the evidence from climategate and other instances of overt cheating.

In the meantime, while I avoid making forecasts for tenths of a degree change in globally averaged temperature anomaly, I am quite willing to state that unprecedented climate catastrophes are not on the horizon though in several thousand years we may return to an ice age.

This entry was posted in [CO2 Effects](#), [Climate Models](#), [Climate Sensitivity](#), [Greenhouse Effect](#). Bookmark the [permalink](#). [Edit](#)

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[G9. The saturated greenhouse effect theory of Ferenc Miskolczi →](#)

2 Responses to *H6. Global Warming: How To Approach The Science*

1. 1



Leonard Weinstein says:

February 16, 2011 at 8:31 am (Edit)

This is solid. I would be interested in any comments from supporters of CAGW on this.

Hal Lewis: My Resignation From The American Physical Society

From: Hal Lewis, University of California, Santa Barbara

To: Curtis G. Callan, Jr., Princeton University, President of the American Physical Society

6 October 2010

Dear Curt:

When I first joined the American Physical Society sixty-seven years ago it was much smaller, much gentler, and as yet uncorrupted by the money flood (a threat against which Dwight Eisenhower warned a half-century ago).

Indeed, the choice of physics as a profession was then a guarantor of a life of poverty and abstinence—it was World War II that changed all that. The prospect of worldly gain drove few physicists. As recently as thirty-five years ago, when I chaired the first APS study of a contentious social/scientific issue, The Reactor Safety Study, though there were zealots aplenty on the outside there was no hint of inordinate pressure on us as physicists. We were therefore able to produce what I believe was and is an honest appraisal of the situation at that time. We were further enabled by the presence of an oversight committee consisting of Pief Panofsky, Vicki Weisskopf, and Hans Bethe, all towering physicists beyond reproach. I was proud of what we did in a charged atmosphere. In the end the oversight committee, in its report to the APS President, noted the complete independence in which we did the job, and predicted that the report would be attacked from both sides. What greater tribute could there be?

How different it is now. The giants no longer walk the earth, and the money flood has become the raison d'être of much physics research, the vital sustenance of much more, and it provides the support for untold numbers of professional jobs.

For reasons that will soon become clear my former pride at being an APS Fellow all these years has been turned into shame, and I am forced, with no pleasure at all, to offer you my resignation from the Society.

It is of course, the global warming scam, with the (literally) trillions of dollars driving it, that has corrupted so many scientists, and has carried APS before it like a rogue wave. It is the greatest and most successful pseudo-scientific fraud I have seen in my long life as a physicist.

Anyone who has the faintest doubt that this is so should force himself to read the ClimateGate documents, which lay it bare. (Montford's book organizes the facts very well.) I don't believe that any real physicist, nay scientist, can read that stuff without revulsion. I would almost make that revulsion a definition of the word scientist.

So what has the APS, as an organization, done in the face of this challenge? It has accepted the corruption as the norm, and gone along with it. For example:

1. About a year ago a few of us sent an e-mail on the subject to a fraction of the membership. APS ignored the issues, but the then President immediately launched a hostile investigation of where we got the e-mail addresses. In its better days, APS used to encourage discussion of important issues, and indeed the Constitution cites that as its principal purpose. No more. Everything that has been done in the last year has been designed to silence debate

2. The appallingly tendentious APS statement on Climate Change was apparently written in a hurry by a few people over lunch, and is certainly not representative of the talents of APS members as I have long known them.

So a few of us petitioned the Council to reconsider it. One of the outstanding marks of (in)distinction in the Statement was the poison word incontrovertible, which describes few items in physics, certainly not this one. In response APS appointed a secret committee that never met, never troubled to speak to any skeptics, yet endorsed the Statement in its entirety. (They did admit that the tone was a bit strong, but amazingly kept the poison word incontrovertible to describe the evidence, a position supported by no one.) In the end, the Council kept the original statement, word for word, but approved a far longer “explanatory” screed, admitting that there were uncertainties, but brushing them aside to give blanket approval to the original. The original Statement, which still stands as the APS position, also contains what I consider pompous and asinine advice to all world governments, as if the APS were master of the universe. It is not, and I am embarrassed that our leaders seem to think it is. This is not fun and games, these are serious matters involving vast fractions of our national substance, and the reputation of the Society as a scientific society is at stake.

3. In the interim the ClimateGate scandal broke into the news, and the machinations of the principal alarmists were revealed to the world. It was a fraud on a scale I have never seen, and I lack the words to describe its enormity.

Effect on the APS position: none. None at all. This is not science; other forces are at work.

4. So a few of us tried to bring science into the act (that is, after all, the alleged and historic purpose of APS), and collected the necessary 200+ signatures to bring to the Council a proposal for a Topical Group on Climate Science, thinking that open discussion of the scientific issues, in the best tradition of physics, would be beneficial to all, and also a contribution to the nation.

I might note that it was not easy to collect the signatures, since you denied us the use of the APS membership list. We conformed in every way with the requirements of the APS Constitution, and described in great detail what we had in mind—simply to bring the subject into the open.

5. To our amazement, Constitution be damned, you declined to accept our petition, but instead used your own control of the mailing list to run a poll on the members’ interest in a TG on Climate and the Environment. You did ask the members if they would sign a petition to form a

TG on your yet-to-be-defined subject, but provided no petition, and got lots of affirmative responses. (If you had asked about sex you would have gotten more expressions of interest.) There was of course no such petition or proposal, and you have now dropped the Environment part, so the whole matter is moot. (Any lawyer will tell you that you cannot collect signatures on a vague petition, and then fill in whatever you like.) The entire purpose of this exercise was to avoid your constitutional responsibility to take our petition to the Council.

6. As of now you have formed still another secret and stacked committee to organize your own TG, simply ignoring our lawful petition.

APS management has gamed the problem from the beginning, to suppress serious conversation about the merits of the climate change claims. Do you wonder that I have lost confidence in the organization?

I do feel the need to add one note, and this is conjecture, since it is always risky to discuss other people's motives. This scheming at APS HQ is so bizarre that there cannot be a simple explanation for it. Some have held that the physicists of today are not as smart as they used to be, but I don't think that is an issue.

I think it is the money, exactly what Eisenhower warned about a half-century ago. There are indeed trillions of dollars involved, to say nothing of the fame and glory (and frequent trips to exotic islands) that go with being a member of the club.

Your own Physics Department (of which you are chairman) would lose millions a year if the global warming bubble burst. When Penn State absolved Mike Mann of wrongdoing, and the University of East Anglia did the same for Phil Jones, they cannot have been unaware of the financial penalty for doing otherwise. As the old saying goes, you don't have to be a weatherman to know which way the wind is blowing. Since I am no philosopher, I'm not going to explore at just which point enlightened self-interest crosses the line into corruption, but a careful reading of the ClimateGate releases makes it clear that this is not an academic question.

I want no part of it, so please accept my resignation. APS no longer represents me, but I hope we are still friends.

Hal

Harold Lewis is Emeritus Professor of Physics, University of California, Santa Barbara, former Chairman; Former member Defense Science Board, chmn of Technology panel; Chairman DSB study on Nuclear Winter; Former member Advisory Committee on Reactor Safeguards; Former member, President's Nuclear Safety Oversight Committee; Chairman APS study on Nuclear Reactor Safety Chairman Risk Assessment Review Group; Co-founder and former Chairman of JASON; Former member USAF Scientific Advisory Board; Served in US Navy in WW II; books: Technological Risk (about, surprise, technological risk) and Why Flip a Coin (about decision making).

Carbon Dioxide and Earth's Future

Pursuing the Prudent Path



Craig D. Idso and Sherwood B. Idso

Center for the Study of Carbon Dioxide and Global Change

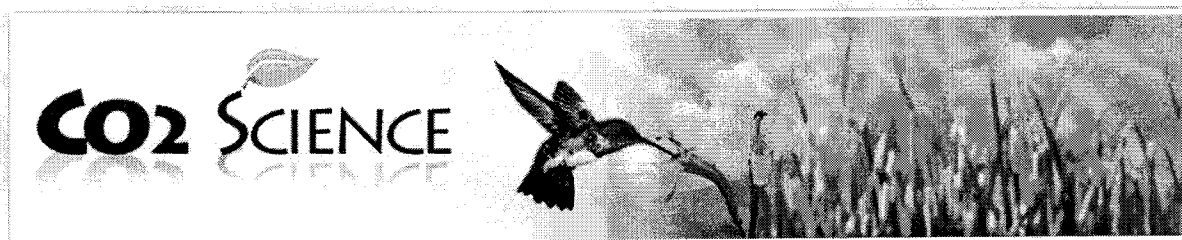


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Executive Summary

As presently constituted, earth's atmosphere contains just slightly less than 400 ppm of the colorless and odorless gas we call carbon dioxide or CO₂. That's only *four-hundredths* of *one percent*. Consequently, even if the air's CO₂ concentration was *tripled*, carbon dioxide would still comprise only a little over *one tenth* of one percent of the air we breathe, which is far less than what wafted through earth's atmosphere eons ago, when the planet was a virtual garden place. Nevertheless, a small increase in this minuscule amount of CO₂ is frequently predicted to produce a suite of dire environmental consequences, including dangerous global warming, catastrophic sea level rise, reduced agricultural output, and the destruction of many natural ecosystems, as well as dramatic increases in extreme weather phenomena, such as droughts, floods and hurricanes.

As strange as it may seem, these frightening future scenarios are derived from a single source of information: the ever-evolving computer-driven *climate models* that presume to reduce the important physical, chemical and biological processes that combine to determine the state of earth's climate into a set of mathematical equations out of which their forecasts are produced. But do we really *know* what all of those complex and interacting processes are? And even if we *did* -- which we *don't* -- could we correctly reduce them into manageable computer code so as to produce reliable forecasts 50 or 100 years into the future?

Some people answer these questions in the affirmative. However, as may be seen in the body of this report, *real-world observations* fail to confirm essentially *all* of the alarming predictions of significant increases in the frequency and severity of droughts, floods and hurricanes that climate models suggest should occur in response to a global warming of the magnitude that was experienced by the earth over the past two centuries as it gradually recovered from the much-lower-than-present temperatures characteristic of the depths of the Little Ice Age. And other observations have shown that the rising atmospheric CO₂ concentrations associated with the development of the Industrial Revolution have actually been *good* for the planet, as they have significantly enhanced the plant productivity and vegetative water use efficiency of earth's natural and agro-ecosystems, leading to a significant "greening of the earth."

In the pages that follow, we present this oft-neglected evidence via a review of the pertinent scientific literature. In the case of the biospheric benefits of atmospheric CO₂ enrichment, we find that with more CO₂ in the air, plants grow bigger and better in almost every conceivable way, and that they do it more *efficiently*, with respect to their utilization of valuable natural resources, and more *effectively*, in the face of environmental constraints. And when *plants* benefit, so do all of the animals and people that depend upon them for their sustenance.

Likewise, in the case of *climate model inadequacies*, we reveal their many *shortcomings* via a comparison of their "doom and gloom" *predictions* with real-world *observations*. And this exercise reveals that even though the world has warmed substantially over the past century or more -- at a rate that is claimed by many to have been *unprecedented* over the past one to two *millennia* -- this report demonstrates that *none* of the environmental catastrophes that are

predicted by climate alarmists to be produced by such a warming has ever come to pass. And this *fact* -- that there have been no significant increases in either the frequency or severity of droughts, floods or hurricanes over the past two centuries or more of global warming -- poses an important question. What should be easier to predict: the effects of global warming on extreme weather events or the effects of elevated atmospheric CO₂ concentrations on global temperature? The first part of this question should, in principle, be answerable; for it is well defined in terms of the small number of known factors likely to play a role in linking the independent variable (global warming) with the specified weather phenomena (droughts, floods and hurricanes). The latter part of the question, on the other hand, is ill-defined and possibly even *unanswerable*; for there are *many* factors -- physical, chemical and *biological* -- that could well be involved in linking CO₂ (or causing it *not* to be linked) to global temperature.

If, then, today's climate models cannot correctly predict what should be relatively easy for them to correctly predict (the effect of global warming on extreme weather events), why should we believe what they say about something infinitely more complex (the effect of a rise in the air's CO₂ content on mean global air temperature)? Clearly, we should pay the models no heed in the matter of *future* climate -- especially in terms of predictions based on the behavior of a *non-meteorological* parameter (CO₂) -- until they can reproduce the climate of the past, based on the behavior of one of the most basic of all *true* meteorological parameters (temperature). And even if the models eventually solve this part of the problem, we should still reserve judgment on their forecasts of global warming; for there will yet be a vast gulf between where they will be at that time and where they will have to go to be able to meet the much greater challenge to which they aspire.

Introduction

Based on the voluminous periodic reports of the Intergovernmental Panel on Climate Change (IPCC), the ongoing rise in the atmosphere's CO₂ concentration has come to be viewed as a monumental danger -- not only to human society, but to the world of nature as well. And the picture is not pretty: *searing heat waves* killing the poor and elderly while drying up precious farmland, *melting polar ice caps* raising sea levels and flooding coastal lowlands, *more frequent and ferocious hurricanes* destroying everything in their paths, *devastating diseases* spreading to regions previously considered immune to them, *migrating plants and animals* unable to move to cooler locations fast enough to avoid extinction, *disappearing coral reefs* dissolving into oblivion as the oceans warm and turn acidic, and *spreading anarchy* within and among nations, as fighting erupts over dwindling water supplies and access to land to grow the food they so desperately need to support their burgeoning populations.

It is no wonder that such people are appropriately referred to en masse as *climate alarmists*, being as alarmed as they are about future climatic conditions on earth. But are these horrific "doomsday scenarios" as set-in-stone as the public is led to believe? Do we really *know* all of the complex and interacting processes that should be included in the models upon which these scenarios are based? And can we properly reduce those processes into manageable computer code so as to produce reliable forecasts 50 or 100 years into the future? At present, the only way to properly answer these questions is to compare climate model *projections* with real-world *observations*. Theory is one thing, but empirical reality is quite another. The former may or may *not* be correct, but the latter is *always* right. As such, the only truly objective method to evaluate climate model projections is by comparing them with real-world data.

In what follows, we conduct just such an appraisal, comparing against real-world observations ten of the more ominous model-based predictions of what will occur in response to continued business-as-usual anthropogenic CO₂ emissions: (1) unprecedented warming of the planet, (2) more frequent and severe floods and droughts, (3) more numerous and stronger hurricanes, (4) dangerous sea level rise, (5) more frequent and severe storms, (6) increased human mortality, (7) widespread plant and animal extinctions, (8) declining vegetative productivity, (9) deadly coral bleaching, and (10) a decimation of the planet's marine life due to ocean acidification. And in conjunction with these analyses, we proffer our view of what the future may hold with respect to the climatic and biological consequences of the ongoing rise in the air's CO₂ content, concluding by providing an assessment of what we feel should be done about the situation.

Open Letter by 18 AGW Alarmists

January 28, 2011

To the Members of the U.S. House of Representatives and the U.S. Senate:

The Importance of Science in Addressing Climate Change

As you begin your deliberations in the new 112th Congress, we urge you to take a fresh look at climate change. Climate change is not just an environmental threat but, as we describe below, also poses challenges to the U.S. economy, national security and public health.

Some view climate change as a futuristic abstraction. Others are unsure about the science, or uncertain about the policy responses. We want to assure you that the science is strong and that there is nothing abstract about the risks facing our Nation. Our coastal areas are now facing increasing dangers from rising sea levels and storm surges; the southwest and southeast are increasingly vulnerable to drought; other regions will need to prepare for massive flooding from the extreme storms of the sort being experienced with increasing frequency. These and other consequences of climate change all require that we plan and prepare. Our military recognizes that the consequences of climate change have direct security implications for the country that will only become more acute with time, and it has begun the sort of planning required across the board.

The health of Americans is also at risk. The U.S. Climate Impacts Report, commissioned by the George W. Bush administration, states: "Climate change poses unique challenges to human health. Unlike health threats caused by a particular toxin or disease pathogen, there are many ways that climate change can lead to potentially harmful health effects. There are direct health impacts from heat waves and severe storms, ailments caused or exacerbated by air pollution and airborne allergens, and many climate-sensitive infectious diseases."

As with the fiscal deficit, the changing climate is the kind of daunting problem that we, as a nation, would like to wish away. However, as with our growing debt, the longer we wait to address climate change, the worse it gets. Heat-trapping carbon dioxide is building up in the atmosphere because burning coal, oil, and natural gas produces far more carbon dioxide than is absorbed by oceans and forests. No scientist disagrees with that. Our carbon debt increases each year, just as our national debt increases each year that spending exceeds revenue. And our carbon debt is even longer-lasting; carbon dioxide molecules can last hundreds of years in the atmosphere.

The Science of Climate Change

It is not our role as scientists to determine how to deal with problems like climate change. That is a policy matter and rightly must be left to our elected leaders in discussion with all Americans. But, as scientists, we have an obligation to evaluate, report, and explain the science behind climate change.

The debate about climate change has become increasingly ideological and partisan. But climate change is not the product of a belief system or ideology. Instead, it is based on scientific fact, and no amount of argument, coercion, or debate among talking heads in the media can alter the physics of climate change.

Political philosophy has a legitimate role in policy debates, but not in the underlying climate science. There are no Democratic or Republican carbon dioxide molecules; they are all invisible and they all trap heat.

The fruits of the scientific process are worthy of your trust. This was perhaps best summed up in recent testimony before Congress by Dr. Peter Gleick, co-founder and director of the Pacific Institute and member of the U.S. National Academy of Sciences. He testified that the scientific process “is inherently adversarial – scientists build reputations and gain recognition not only for supporting conventional wisdom, but even more so for demonstrating that the scientific consensus is wrong and that there is a better explanation. That’s what Galileo, Pasteur, Darwin, and Einstein did. But no one who argues against the science of climate change has ever provided an alternative scientific theory that adequately satisfies the observable evidence or conforms to our understanding of physics, chemistry, and climate dynamics.”

National Academy of Sciences

What we know today about human-induced climate change is the result of painstaking research and analysis, some of it going back more than a century. Major international scientific organizations in disciplines ranging from geophysics to geology, atmospheric sciences to biology, and physics to human health – as well as every one of the leading national scientific academies worldwide – have concluded that human activity is changing the climate. This is not a “belief.” Instead, it is an objective evaluation of the scientific evidence.

The U.S. National Academy of Sciences (NAS) was created by Abraham Lincoln and chartered by Congress in 1863 for the express purpose of obtaining objective expert advice on a range of complex scientific and technological issues. Its international reputation for integrity is unparalleled. This spring, at the request of Congress, the NAS issued a series of comprehensive reports on climate change that were unambiguous.

The NAS stated, “Climate change is occurring, is caused largely by human activities . . . and in many cases is already affecting a broad range of human and natural systems.” This conclusion comes as no surprise to the overwhelming majority of working climate scientists.

Climate Change Deniers

Climate change deniers cloak themselves in scientific language, selectively critiquing aspects of mainstream climate science. Sometimes they present alternative hypotheses as an explanation of a particular point, as if the body of evidence were a house of cards standing or falling on one detail; but the edifice of climate science instead rests on a concrete foundation. As an open letter from 255 NAS members noted in the May 2010 *Science* magazine, no research results have

produced any evidence that challenges the overall scientific understanding of what is happening to our planet's climate and why.

The assertions of climate deniers therefore should not be given scientific weight equal to the comprehensive, peer-reviewed research presented by the vast majority of climate scientists.

The determination of policy sits with you, the elected representatives of the people. But we urge you, as our elected representatives, to base your policy decisions on sound science, not sound bites. Congress needs to understand that scientists have concluded, based on a systematic review of all of the evidence, that climate change caused by human activities raises serious risks to our national and economic security and our health both here and around the world. It's time for Congress to move on to the policy debate.

How Can We Move Forward?

Congress should, we believe, hold hearings to understand climate science and what it says about the likely costs and benefits of action and inaction. It should not hold hearings to attempt to intimidate scientists or to substitute ideological judgments for scientific ones. We urge our elected leaders to work together to focus the nation on what the science is telling us, particularly with respect to impacts now occurring around the country.

Already, there is far more carbon in the air than at any time in human history, with more being generated every day. Climate change is underway and the severity of the risks we face is compounded by delay.

We look to you, our representatives, to address the challenge of climate change, and lead the national response. We and our colleagues are prepared to assist you as you work to develop a rational and practical national policy to address this important issue.

Thank you for your attention.

Sincerely,

John Abraham, University of St. Thomas
Barry Bickmore, Brigham Young University
Gretchen Daily,* Stanford University
G. Brent Dalrymple,* Oregon State University
Andrew Dessler, Texas A&M University
Peter Gleick,* Pacific Institute
John Kutzbach,* University of Wisconsin-Madison
Syukuro Manabe,* Princeton University
Michael Mann, Penn State University
Pamela Matson,* Stanford University
Harold Mooney,* Stanford University
Michael Oppenheimer, Princeton University
Ben Santer, Lawrence Livermore National Laboratory

Richard Somerville, Scripps Institution of Oceanography
Kevin Trenberth, National Center for Atmospheric Research
Warren Washington, National Center for Atmospheric Research
Gary Yohe, Wesleyan University
George Woodwell,* The Woods Hole Research Center

*Member of the National Academy of Sciences

Responding Open Letter by Climate Scientists

The Truth About Climate Change Open Letter:

Open Letter to the United States Congress

8 February 2011

To the Members of the U.S. House of Representatives and the U.S. Senate:

In reply to “The Importance of Science in Addressing Climate Change”

On 28 January 2011, eighteen scientists sent a letter (see also this news story) to members of the U.S. House of Representatives and the U.S. Senate urging them to “take a fresh look at climate change.” Their intent, apparently, was to disparage the views of scientists who disagree with their contention that continued business-as-usual increases in carbon dioxide (CO₂) emissions produced from the burning of coal, gas, and oil will lead to a host of cataclysmic climate-related problems.

We, the undersigned, totally disagree with them and would like to take this opportunity to briefly state our side of the story.

The eighteen climate alarmists (as we refer to them, not derogatorily, but simply because they view themselves as “sounding the alarm” about so many things climatic) state that the people of the world “need to prepare for massive flooding from the extreme storms of the sort being experienced with increasing frequency,” as well as the “direct health impacts from heat waves” and “climate-sensitive infectious diseases,” among a number of other devastating phenomena. And they say that “no research results have produced any evidence that challenges the overall scientific understanding of what is happening to our planet’s climate,” which is understood to mean their view of what is happening to Earth’s climate.

To these statements, however, we take great exception. It is the eighteen climate alarmists who appear to be unaware of “what is happening to our planet’s climate,” as well as the vast amount of research that has produced that knowledge.

For example, a lengthy review of their claims and others that climate alarmists frequently make can be found on the Web site of the Center for the Study of Carbon Dioxide and Global Change (see Carbon Dioxide and Earth’s Future: Pursuing the Prudent Path). That report offers a point-by-point rebuttal of all of the claims of the “group of eighteen,” citing in every case peer-reviewed scientific research on the actual effects of climate change during the past several decades.

If the “group of eighteen” pleads ignorance of this information due to its very recent posting, then we call their attention to an even larger and more comprehensive report published in 2009, Climate Change Reconsidered: The 2009 Report of the Nongovernmental International Panel on

Climate Change (NIPCC). That document has been posted for more than a year in its entirety at <http://www.nipccreport.org>.

These are just two recent compilations of scientific research among many we could cite. Do the 678 scientific studies referenced in the CO2 Science document, or the thousands of studies cited in the NIPCC report, provide real-world evidence (as opposed to theoretical climate model predictions) for global warming-induced increases in the worldwide number and severity of floods? No. In the global number and severity of droughts? No. In the number and severity of hurricanes and other storms? No.

Do they provide any real-world evidence of Earth's seas inundating coastal lowlands around the globe? No. Increased human mortality? No. Plant and animal extinctions? No. Declining vegetative productivity? No. More frequent and deadly coral bleaching? No. Marine life dissolving away in acidified oceans? No.

Quite to the contrary, in fact, these reports provide extensive empirical evidence that these things are not happening. And in many of these areas, the referenced papers report finding just the opposite response to global warming, i.e., biosphere-friendly effects of rising temperatures and rising CO2 levels.

In light of the profusion of actual observations of the workings of the real world showing little or no negative effects of the modest warming of the second half of the twentieth century, and indeed growing evidence of positive effects, we find it incomprehensible that the eighteen climate alarmists could suggest something so far removed from the truth as their claim that no research results have produced any evidence that challenges their view of what is happening to Earth's climate and weather.

But don't take our word for it. Read the two reports yourselves. And then make up your own minds about the matter. Don't be intimidated by false claims of "scientific consensus" or "overwhelming proof." These are not scientific arguments and they are simply not true.

Like the eighteen climate alarmists, we urge you to take a fresh look at climate change. We believe you will find that it is not the horrendous environmental threat they and others have made it out to be, and that they have consistently exaggerated the negative effects of global warming on the U.S. economy, national security, and public health, when such effects may well be small to negligible.

Signed by,

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1 – Emeritus or Retired

2 – Member of the National Academy of Sciences

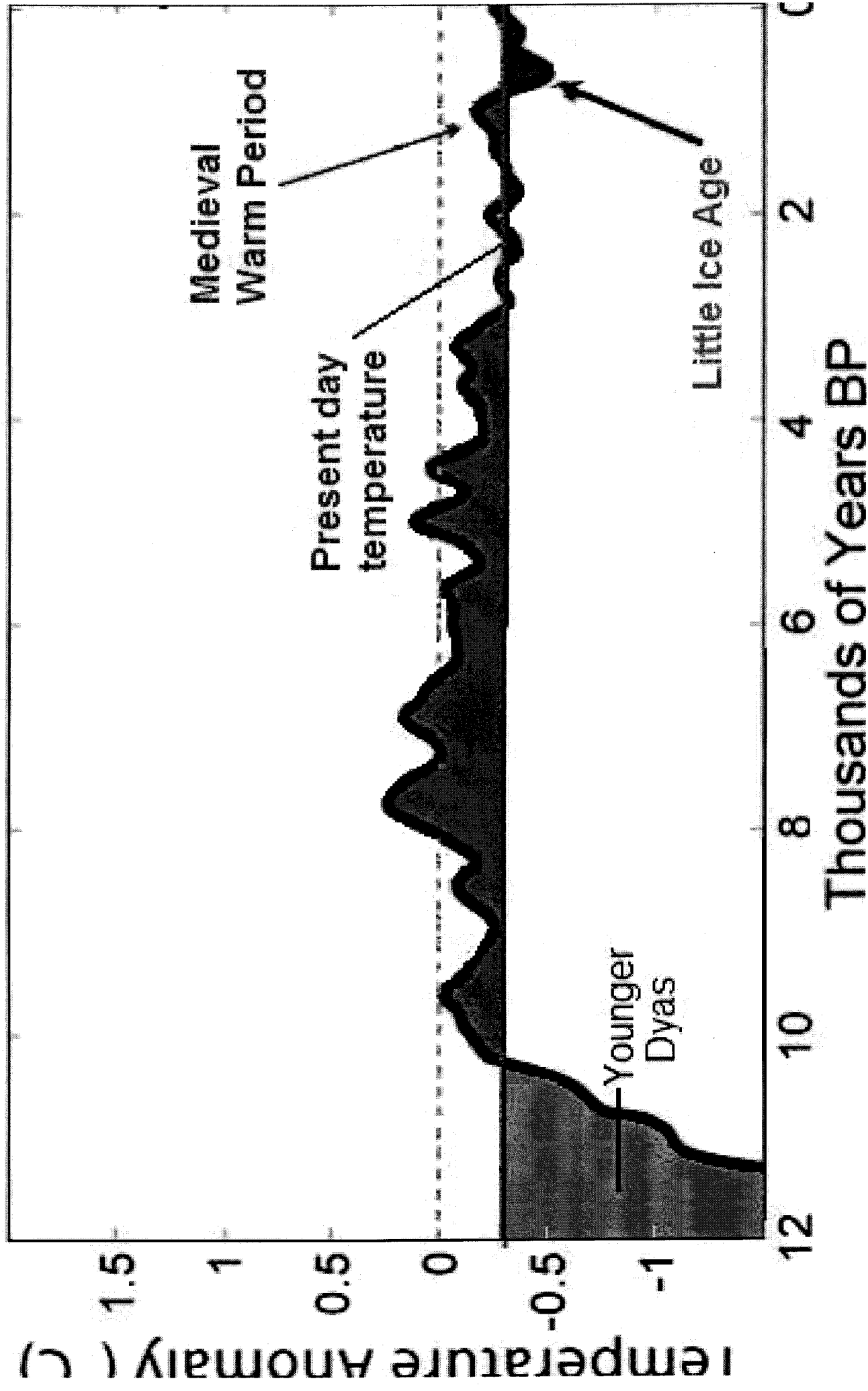
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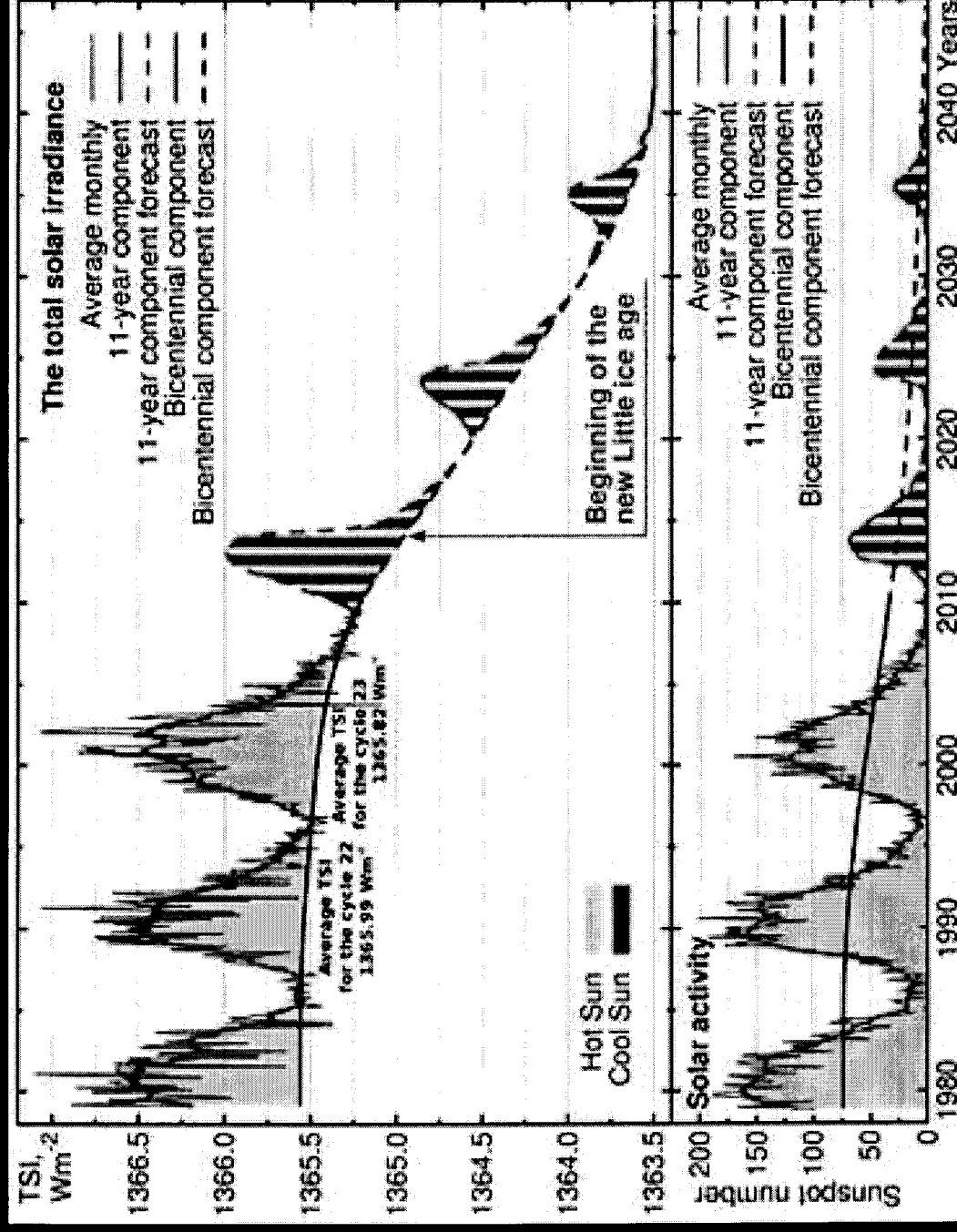
Holocene Temperature Variations



The New Little Ice Age will begin 2014

The gradual decrease in global temperature will pause in 2010 -2012.

It will resume in 2013-2015 and reach its minimum in 2050 to 2070.



Abdussamatov